

NEW RECORDS OF FIVE SPECIES OF GENUS *SARBANISSA* WALKER, 1865 (NOCTUIDAE: AGARISTINAE) FROM INDIA AND COMMENTS ON THEIR DISTRIBUTION

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ABSTRACT

the occurrence of moth genus *Sarbanissa* Walker, 1865 in north eastern states of India was studied. The observations and collections were made at different localities in the north eastern state of India along with the states of Sikkim and West Bengal. We encountered nine species during the survey of which five species, *S. flavida* (Leech, 1890), *S. subalba* (Leech, 1890), *S. interposita* Hampson, 1910, *S. bala* (Moore, 1865) and *S. tricycla* Sugi, 1993 were reported for the first time from India. Thus, the number of species of *Sarbanissa* known from India increased from ten to fourteen. The updated checklist on the *Sarbanissa* recorded from India with their distribution is presented.

Keywords: Agaristinae, *Sarbanissa*, new record, Noctuidae, taxonomy, India.

INTRODUCTION

The North Eastern Region of India that covers 8% of the whole territory of the country is part of the Eastern Himalaya hotspot which includes all the eight states

of Northeast India (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim), along with the neighboring countries of Bhutan, southern China and Myanmar. It is one of the most species-rich region in the world.

The *Sarbanissa* Walker, 1865 was established with *S. insocia* Walker, 1865 as its type species (Type locality – Darjeeling). The genus is mainly distributed in the Oriental and Palaearctic regions. There are twenty-six described species (Wei *et al.*, 2019). Of these, fourteen species are known from India (Hampson, 1894; Kononenko & Pinratana, 2005, 2013; Kirti *et al.*, 2014; Sanyal *et al.*, 2018; Chandra *et al.*, 2019).

The recent study conducted in different parts of north east Indian states reveals that the *Sarbanissa* Walker, 1865 is widely distributed in the region. In the present paper, we report nine species of *Sarbanissa* collected from the region. Of which, five species are recorded for the first time from India, viz. *S. flavida* (Manipur), *S. subalba* (Manipur), *S. interposita* (Manipur), *S. bala* (Manipur)

and *S. tricycla* (Neora valley, West Bengal).

The species which are reported for the first time from north east India are *S. catacoloides* from Arunachal Pradesh, Manipur, Meghalaya and Nagaland; *S. transiens* from Manipur; and *S. insocia* from Arunachal Pradesh and Nagaland.

Further details in their records, diagnostic features, and their local and global distributions are provided below.

Appendix I provides the complete list of the species recorded from India with their local and global distributional records.

MATERIAL AND METHODS

The specimens studied in the paper were collected from different localities of north eastern Indian states (Table 1) collected using light traps. The specimens were either photographed or collected, killed in the field, dried by silica gel, and kept for later identification. For genitalia preparation, protocols developed by Robinson (1976) were followed. The abdomen was soaked in 10% KOH for 24 hours at room temperature. Later, the genitalia was cleaned and stored in glycerol. For photographs, genitalia was placed on a slide in glycerol with a cover slip. Genitalia was photographed using Olympus SZX16 Stereo Microscope fitted with Promica camera. The photographs are processed using photo editing software (Irfanview v. 4.54 and CorelDRAW Graphics Suite 2020).

Identification of the materials are based on the keys and descriptions provided by Hampson (1894), Holloway (1987), Kononenko & Pinratana (2005, 2013), Kirti *et al.* (2014), Chandra *et al.* (2019) and Wei *et al.* (2019).

Taxonomic account

Sarbanissa Walker, 1865

Sarbanissa Walker, 1865, *List Spec. Lep. Colln. Br. Mus.* **33**: 746. Type species: *Sarbanissa insocia* Walker.

Sarbanissa flavida (Leech, 1890)

(Figs. 2-3, 18)

Sedyra flavida Leech, 1890; *Entomologist* **23**: 110. Type locality: China, Chang Yang.

Zalissa flavida: Leech 1899, *Trans. ent. Soc.* **3**: 212; Jordan 1914, in Seitz, *Macrolep. World* **3**: 7, pl, 1e.

Sedyra flavida: Hampson 1910, *Cat. Phal. Br. Mus.* **9**: 432, pl. 146, fig. 9; Chen 1982, *Icon. Het. Sin.* **3**: 388.

Sarbanissa flavida: Chen 1999: 130; Wei *et al.* 2019: 358.

Material examined. 1 male, INDIA, Manipur state, Ukhrul district, Shirui village, Shirui hills (Site 3), 25.117154°N, 94.445603°E, 2190 m., 13.ix.2019, (Coll. IJS), Genitalia slide no. IJ2507m (Coll. IJS).

Photographic records examined. None.

Diagnosis: Male Length of forewing 26 mm. Female not examined. Forewing brownish grey covered densely with brown dots, the area outside the media and vein 2 is darkish purple and with a blackish purple speckle at the apex, orbicular and reniform stigma purplish black with white edge. Hindwing apricot shaped, with the almost invisible discal spot of hindwing and absence of the black band.

This species is characterized by the almost invisible discal spot of the hindwing the

and absence of black band (Wei *et al.*, 2019).

Distribution. India: Manipur (In the present study). *Elsewhere.* China (Wei *et al.*, 2019).

Comments: The species is recorded for the first time from India.

***Sarbanissa catacoloides* (Walker, 1862)**

(Figs. 4-5, 21) *Phaegorista catacoloides* Walker, 1862, *J. Linn. Soc., Zool.* **6**: 87. Type locality: Borneo, Sarawak.

Seodyra catacoloides: Jordan 1912, in Seitz, *Macrolep. World* 11: 28, pl. 4d.

Sarbanissa catacoloides: Chen, 1999: 134; Kononenko & Pinratana, 2005: 142; Holloway, 1989: 206; Wei *et al.*, 2019: 358.

Material examined. 1 female. INDIA, Manipur state, Ukhrul district, Shirui village, Shirui hills (Site 4), 25.111222°N, 94.453431°E, 2425 m., 25.vii.2019, Genitalia slide no. IJ610f (Coll. IJS).

Photographic material examined. 1 female, photo taken on 10.x.2015, INDIA, Arunachal Pradesh, Upper Siang district, Jengging, 28.545592°N 95.060258°E, 833 m. (photo by A. Vaidya); 1 male, photo taken on 05.iv.2008, INDIA, Arunachal Pradesh, West Kameng district, Eaglenest Wildlife Sanctuary, Bompou camp, 27.066333°N 92.406475°E, 1951 m. (photo by A. Vaidya); 1 male, photo taken on 24.iv.2014, INDIA, Meghalaya, East Khasi Hills district, Cherrapunji, 25.219258°N 91.662592°E, 906 m. (photo by A. Vaidya).

Diagnosis. Male: Length of forewing 26 mm. Female not examined. This species can be distinguished by forewing brown,

orbicular, and reddish black reniform stigma with a white speckle outside. The hindwing has a small discal spot, a terminal band narrow, with a zigzag inner edge. This species can be distinguished by the following combination of characters: forewing brown; hindwing with discal spot obscure, terminal band brownish black, and continuous, anal angle yellow.

Distribution. India: Arunachal Pradesh, Manipur, Meghalaya, Nagaland (In the present study). *Elsewhere.* Nepal (Sugi, 1993); Myanmar, China, Laos, Thailand, Vietnam, Malaysia, Borneo, Sumatra, Java, Bali, Lombok (Holloway, 1989; Kononenko & Pinratana, 2005).

Comments: The species is recorded for the first time from north eastern India (Arunachal Pradesh, Manipur, Nagaland).

***Sarbanissa transiens* (Walker, 1856)**

(Figs. 6-7, 19)

Eusemia transiens Walker, 1856, *List Spec. Lep. Colln. Br. Mus.* **7**: 1588. Type locality: Java.

Eusemia aegoceroideus Boisduval, 1874, *Rev. et magaz. zool.*: 106.

Seodyra dissimilis Swinhoe, 1890. *Trans. ent. Soc.*: 174.

Seodyra transiens subalba: Mell 1936 (nec Leech), *Stett. ent. Z.* **97**: 180, figs. 12–13.

Seodyra transiens: Hampson, 1910, *Cat. Lep. Phal. Br. Mus.* **9**: 437; Jordan, 1912, in Seitz, *Macrolep. World* 11: 27, pl. 4d; Chen, 1982, *Icon. Het. Sin.* **3**: 389.

Sarbanissa transiens: Chen, 1999: 132; Kononenko & Pinratana, 2005: 142; Holloway, 1989: 206; Park *et al.*, 2007: 88; Wei *et al.*, 2019: 361.

Sarbanissa speciosa Orhant, 2015, *Bull. Soc. ent. Mulhouse*. 71 (3): 51–53. syn. nov.

Sarbanissa transiens: Chandra et al. 2019: 240, pl. 141, fig. 17.

Material examined. 1 male. INDIA, Manipur state, Ukhrul district, Shirui village, Shirui hills (Site 1), 25.126444°N, 94.435722°E, 1930 m., 12.vii.2016, (Coll. IJS); 1 male. INDIA, Manipur state, Ukhrul district, Shirui village, Shirui hills (Site 3), 25.117154°N, 94.445603°E, 2190 m., 24.vii.2019, (Coll. IJS). Genitalia slide no. IJ2585m.

Photographic material examined. 1 male, photo taken on 14.x.2015, INDIA, Arunachal Pradesh, Dibang valley district, 28.188275°N 95.799267°E, 594 m. (photo by A. Vaidya); 3 males, photo taken on 10.vii.2017, 02.viii.2019, INDIA, Arunachal Pradesh, Dibang valley district, Mishmi Hills, Mayodia pass, 28.233033°N 95.908894°E, 2488 m. (photo by A. Vaidya); 1 female, photo taken on 10.x.2015, INDIA, Arunachal Pradesh, Pakke-Kessang district, 27.159158°N 93.221350°E 1304 m. (photo record by AV); 1 male, photo taken on 27.vii.2014, INDIA, Nagaland, Zunheboto district, Akuluto town, 26.177647°N 94.497250°E, 1144 m. (photo by A. Vaidya); 1 male, photo taken on 12.x.2012, INDIA, Nagaland, Phek district, Chizami town, 25.22090°N 94.377389°E, 1494 m. (photo by A. Vaidya); 1 female, photo taken on 23.xi.2014, INDIA, Nagaland, Mokochung district, Yaongyimsen village, 25.22090°N 94.377389°E, 1494 m. (photo by A. Vaidya).

Diagnosis. Male Length of forewing 26 mm. Female not examined.

The species is characterized by the continuous, broad and darkish black terminal band from anal angle to costal

margin of hindwing. This species is similar to *S. subalba*, but the forewing with the area around orbicular stigma is black rather than greyish white and the hindwing with the terminal band broader in *S. transiens* than in *S. subalba*.

Distribution. India: North east Himalayas; Uttarakhand (Sanyal *et al.*, 2018; Chandra *et al.*, 2019); Sikkim, Meghalaya (Khasis), Nagaland (Naga Hills) (Hampson, 1894); Manipur (In the present study). *Elsewhere.* Nepal (Sugi, 1993); China (Wei *et al.*, 2019); Laos (Eda, 2020); Vietnam (Park *et al.*, 2007); Myanmar, Thailand, Malaysia, Sumatra, Java (Kononenko & Pinratana, 2005); Borneo (Holloway, 1989).

Comments. The species is recorded for the first time from Manipur. Previously, the species was recorded from Sikkim, Meghalaya, Nagaland (Hampson, 1894) and Uttarakhand (Sanyal *et al.*, 2018).

Sarbanissa subalba (Leech, 1890)

(Figs. 8-9, 20)

Seudyra subalba Leech, 1890, *Entomologist* 23: 110. Type locality: China (Chang Yang).

Sarbanissa subalba Kononenko & Pinratana, 2005: 143; Wei *et al.*, 2019: 360; Eda, 2020:

Material examined. 1 male, INDIA, Manipur state, Ukhrul district, Shirui village, Shirui hills (Site 4), 25.111222°N, 94.453431°E, 2425 m., 25.vii.2019, Genitalia slide no. IJ2724m (Coll. IJS).

Photographic material examined. None.

Diagnosis. Male Length of forewing 19 mm. Female not examined. Forewing reddish purple, reniform and orbicular stigma blackish purple with white edge. Hindwing without discal spot, terminal

band narrow and gradually dilating from costa to anal angle. The area around orbicular stigma of forewing is with greyish white scales.

Distribution. India: Sikkim (Sanyal *et al.*, 2018); Manipur (In the present study). *Elsewhere.* Nepal, Myanmar, China, Thailand, Vietnam, Malay Peninsula (Kononenko & Pinratana, 2013), Laos (Eda, 2020).

Comments. The species is recorded for the first time from Manipur.

***Sarbanissa interposita* Hampson, 1910**

(Figs. 10-11, 22)

Seudyra interposita Hampson, 1910, *Cat. Lepid. Phalaenae Br. Mus.* 9: 437, pl. 148, fig. 11. Type locality: China (Chin-Fu-San).

Seudyra interposita kuangtungensis Mell, 1936. *Stett. ent. Z.* 97: 182.

Sarbanissa interposita Wei *et al.*, 2019: 359, Figs. 17, 30, 36.

Material examined. 1 female, INDIA, Manipur state, Ukhrul district, Shirui village, Shirui hills (Site 4), 25.111222°N, 94.453431°E, 2425 m., 25.vii.2019, Genitalia slide no. IJ2846f (Coll. IJS).

Photographic material examined. None.

Diagnosis. Female Length of forewing: 22 mm. Male not examined. Forewing reddish purplish black, not brown, orbicular and reniform stigma brownish, terminal band narrower, darkish black rather than brownish black, and anal angle black. Hindwing with a discal spot, terminal band broad with inner edge wavy.

Distribution. India: North India (Mell, 1936); Sikkim (Sanyal *et al.*, 2018);

Manipur (In the present study). *Elsewhere.* China, Taiwan (Wei *et al.*, 2019).

Comments. The species is recorded for the first time from Manipur.

***Sarbanissa bala* (Moore, 1865)**

(Figs. 12-13, 23)

Phaegorista bala Moore, 1865. *Proc. zool. Soc.*: 795. Type locality: India (Darjeeling).

Material examined. 1 female, INDIA, Manipur state, Ukhrul district, Shirui village, Shirui hills (Site 3), 25.117154°N, 94.445603°E, 2190 m., 24.vii.2019, Genitalia slide no. IJ2517f (Coll. IJS).

Photographic material examined. None.

Diagnosis. Female Length of forewing 22 mm. Male not examined. Forewing brownish black, with white scales outside the reniform stigma, orbicular and reniform stigma black. Hindwing with terminal band darkish black, continuous and broad, terminal band from costa to anal angle black, submedial area with a black, longitudinal stripe, discal spot small.

Differs from *transiens* in the grey marbling of fore wing being suffused with fuscous. Hind wing with a black spot at end of cell; the marginal band extending more round anal angle and suffused with yellow on the underside.

Distribution. India: Sikkim (Hampson, 1894; Sanyal *et al.*, 2018); Manipur (In the present study). *Elsewhere.* Nepal, Myanmar, China, Thailand (Chen, 1999; Kononenko & Pinratana, 2005).

Comments. The species is recorded for the first time from Manipur.

***Sarbanissa insocia* Walker, 1865**

(Figs. 14-15)

Sarbanissa insocia Walker, 1865, *List Spec. Lep. Colln. br. Mus.* 33: 746. Type locality: India (Darjeeling).

Material examined. None.

Photographic material examined. 1 male, photo taken on 23.v.2012, INDIA, Nagaland, Kohima district, Dzuleketown, 25.618289°N 93.954183°E, 1733 m. (photo by A. Vaidya); 1 male, photo taken on 14.x.2015, INDIA, Arunachal Pradesh, Upper Siang district, Jengging, 28.545592°N 95.060258°E, 833 m. (photo by A. Vaidya); 1 male, photo taken on 14.x.2015, INDIA, Arunachal Pradesh, West Kameng district, Mandala, 27.295217°N 92.256594°E, 2500 m. (photo by A. Vaidya); 3 males, photo taken on 25.ix.2014, 10.vii.2017, 02.viii.2019, INDIA, Arunachal Pradesh, Dibang valley district, Mishmi Hills, Mayodia pass, 28.233033°N 95.908894°E, 2488 m. (photo by A. Vaidya).

Diagnosis. Forewing chocolate-black with grey line and patches, orbicular and reniform stigma big, brownish black with white edge. Hindwing apricot, discal spot small and black, subterminal band narrowing towards costa margin, submedial area with a black, longitudinal stripe.

Distribution. India: West Bengal (Darjeeling) (Walker, 1865); Himachal Pradesh, Sikkim, West Bengal, Arunachal Pradesh (Chandra *et al.*, 2019); Nagaland (In the present study). *Elsewhere.* Nepal, China, Thailand (Chen, 1999; Kononenko & Pinratana, 2013; Wei *et al.*, 2019).

Comments. Recently, the species was also recorded from Dihang-Dibang Biosphere reserve, Arunachal Pradesh and abundantly found at the altitude, 1968m (Basam) and 2251m (Chagu) (Chandra *et*

al., 2019). The species is recorded for the first time from Nagaland.

***Sarbanissa tricycla* Sugi, 1993**

(Figs. 16)

Sarbanissa tricycla Sugi, 1993; *Tinea* 13 (Suppl. 3): 96, pl. 58, f. 7; Type locality: Godavari.

Material examined. None.

Photographic material examined. 1 female, photo taken on 10.V.2019, INDIA, West Bengal, Kalimpong district, Neora valley, 27.102539°N 88.675578°E, 1646 m. (photo by A. Vaidya).

Diagnosis. Head with front black with lateral whitish fringe. Palpi long, apically slightly dilated, black with whitish fringe. Vertex black covered by whitish hair. Forewing with creamy white ground color with markings dark grey except subbasal round spot and longitudinal bar above it below costa, and subapical and tornal round spots and a few cuneous striae between them posterior to double postmedial line, all of which are deep red brown. Hindwing with pale lemon yellow, with black broad marginal band. Abdomen yellow, with basal crests black laterally associated with pale yellow, and black quadrate spot on each of the 3rd to 8th segment, anal hair tuft absent.

Distribution: India: West Bengal, Neora valley (in the present study). *Elsewhere.* Nepal (Sugi, 1993); Thailand (Kononenko & Pinratana, 2013).

Comments: The species is recorded for the first time from India (West Bengal).

***Sarbanissa longipennis* (Walker, 1865)**

(Figs. 17) *Catocala longipennis* Walker, 1865, *List Spec. Lep. Colln. Br. Mus.* 33: 934. Type locality: Assam.

Seodyra longipennis: Hampson 1910. *Cat. Lep. Phal. Br. Mus.* 9: 432, text fig. 207; Jordan 1912, in *Seitz, Macrolep. World* 11:27. pl. 4d; Chen, 1982, *Icon. Het. Sin.* 3: 389; Chen, 1993, *Ins. Hengduan Mts.* 3: 1033.

Sarbanissa longipennis: Chen, 1999: 131; Kononenko & Pinratana, 2005: 143; Singh *et al.*, 2014: 321; Wei *et al.*, 2019: 359, Figs. 4, 20.

Material examined. None.

Photographic material examined. 1 male, photo taken on 23.v.2012, INDIA, Nagaland, Kohima district, Dzuleke town, 25.618289°N 93.954183°E, 1733 m. (photo by A. Vaidya); 1 male, photo taken on 21.ix.2014, INDIA, Arunachal Pradesh, Anjaw District, Hawai, 27.884281°N 96.807561°E, 1225 m. (photo by A. Vaidya).

Diagnosis. Forewing greyish black, reniform and orbicular stigma relatively small, apical and inner margin area dark black. Hindwing with discal spot almost invisible, terminal band continuous, broad and dark black, with zigzagged inner edge, anal angle yellow.

Distribution. India: Arunachal Pradesh (Sanyal *et al.*, 2018); Sikkim, Manipur, Nagaland (Nagas)(Hampson, 1894); Assam, Mizoram (Kirti *et al.*, 2014). *Elsewhere.* Bangladesh (Hampson, 1894), China (Chen, 1999), Myanmar, Thailand, Vietnam (Kononenko & Pinratana, 2005), Laos (Eda, 2020).

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for collection and survey at Shirui Hills, Ukhrul district.

Conflict of Interest

None

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TABLE 1. The sampling localities of *Sarbanissa* spp. from north eastern India.

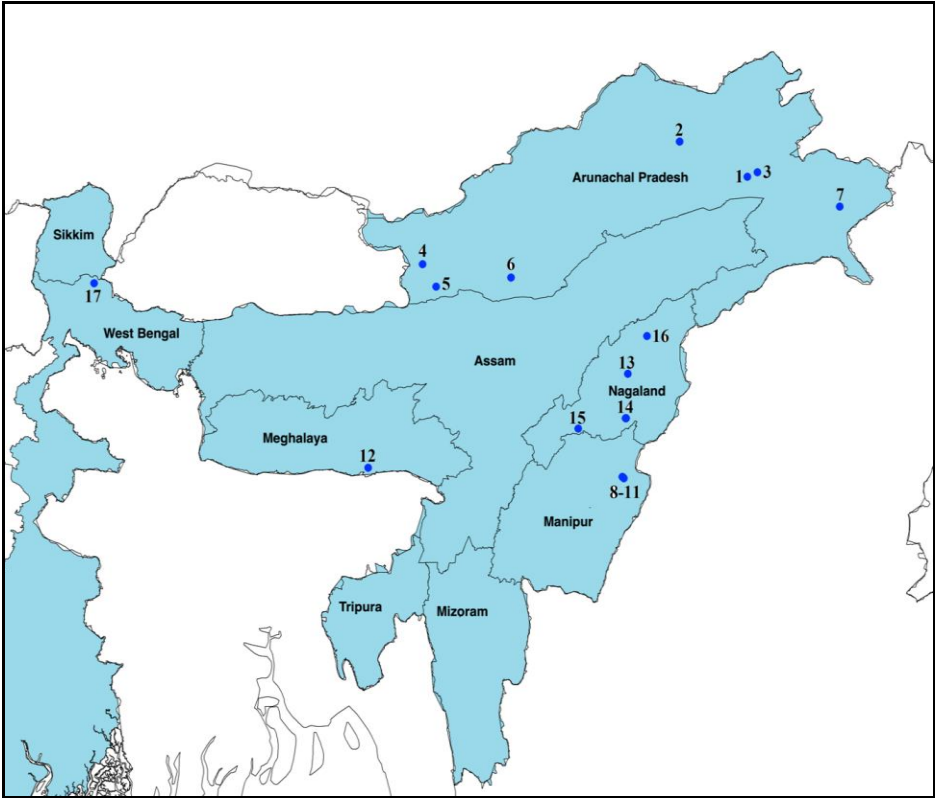
Sr. no.	State	Locality	GPS coordinates		Altitude m ASL
			Latitude	Longitude	
1	Arunachal Pradesh	Dibang Valley	28.188275	95.799267	594
2	Arunachal Pradesh	Jengging	28.545592	95.060258	833
3	Arunachal Pradesh	Mayodia, Mishmi Hills	28.233033	95.908894	2488
4	Arunachal Pradesh	Mandala	27.295217	92.256594	2500
5	Arunachal Pradesh	Bompou Camp, EWLS	27.066333	92.406475	1951
6	Arunachal Pradesh	Pakkekesang	27.159158	93.221350	1304
7	Arunachal Pradesh	Hawai	27.884281	96.807561	1225
8	Manipur	Shirui Hills (Site 1)	25.126444	94.435722	1930
9	Manipur	Shirui Hills (Site 2)	25.1235	94.4407	2036
10	Manipur	Shirui Hills (Site 3)	25.117154	94.445603	2190
11	Manipur	Shirui Hills (Site 4)	25.111222	94.453431	2425
12	Meghalaya	Cherrapunji	25.219258	91.662592	906
13	Nagaland	Akuluto	26.177647	94.497250	1144
14	Nagaland	Chizami	25.220900	94.377389	1494
15	Nagaland	Dzuleke	25.618289	93.954183	1733
16	Nagaland	Yaongyimsen	26.563886	94.703028	965
17	West Bengal	Neora Valley	27.102539	88.675578	1646

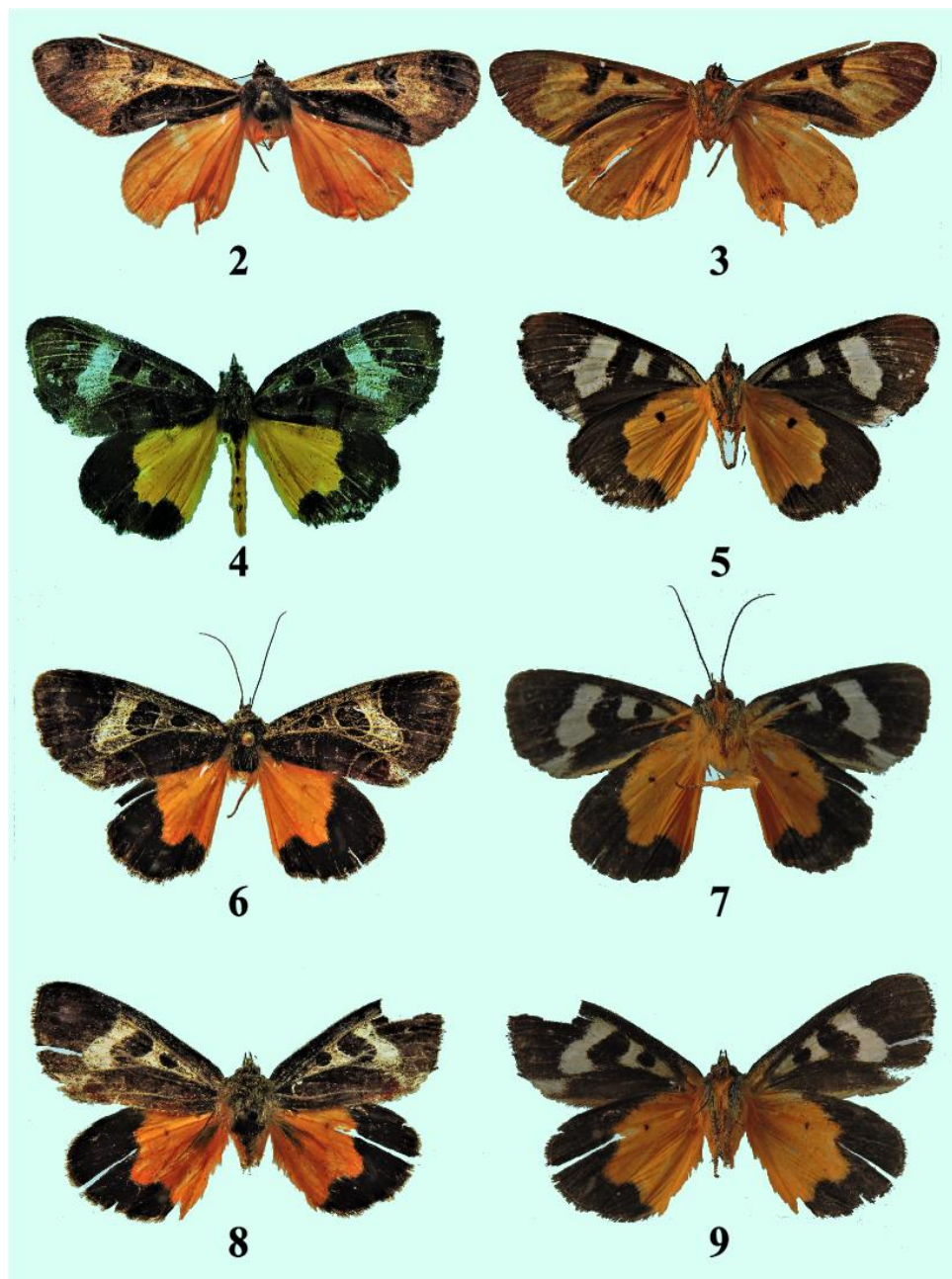
Appendix I. An updated checklist of *Sarbanissa* species reported from India.

Sr. no.	Species	Reference
1	<i>Sarbanissa albifascia</i>	Kirti <i>et al.</i> 2014; Sanyal <i>et al.</i> 2018
2	<i>Sarbanissa bala</i> (Moore, 1865)	Sanyal <i>et al.</i> 2018
3	<i>Sarbanissa catacoloides</i> (Walker, 1862)	Holloway 1989; Present study
4	<i>Sarbanissa flavida</i> (Leech, 1890)	Present study
5	<i>Sarbanissa insocia</i> Walker, 1865	Walker 1865; Chandra <i>et al.</i> 2019
6	<i>Sarbanissa interposita</i> Hampson, 1910	Sanyal <i>et al.</i> 2018; Present study
7	<i>Sarbanissa longipennis</i> (Walker, 1865)	Walker 1865; Hampson 1894; Kirti <i>et al.</i> 2014; Sanyal <i>et al.</i> 2018); Present study
8	<i>Sarbanissa nepcha</i> Moore, 1867	Type locality Sikkim
9	<i>Sarbanissa poecila</i> Jordan, 1912	Type locality Sikkim
10	<i>Sarbanissa subalba</i> Leech, 1890	Mell 1936; Sanyal <i>et al.</i> 2018; Present study
11	<i>Sarbanissa subflava</i> (Moore, 1877)	Wei <i>et al.</i> 2019
12	<i>Sarbanissa transiens</i> (Walker, 1856)	Hampson 1894; Sanyal <i>et al.</i> 2018; Chandra <i>et al.</i> 2019; Present study
13	<i>Sarbanissa tricycla</i> Sugi, 1993	Present study
14	<i>Sarbanissa venosa</i> Moore, 1879	Sanyal <i>et al.</i> 2018

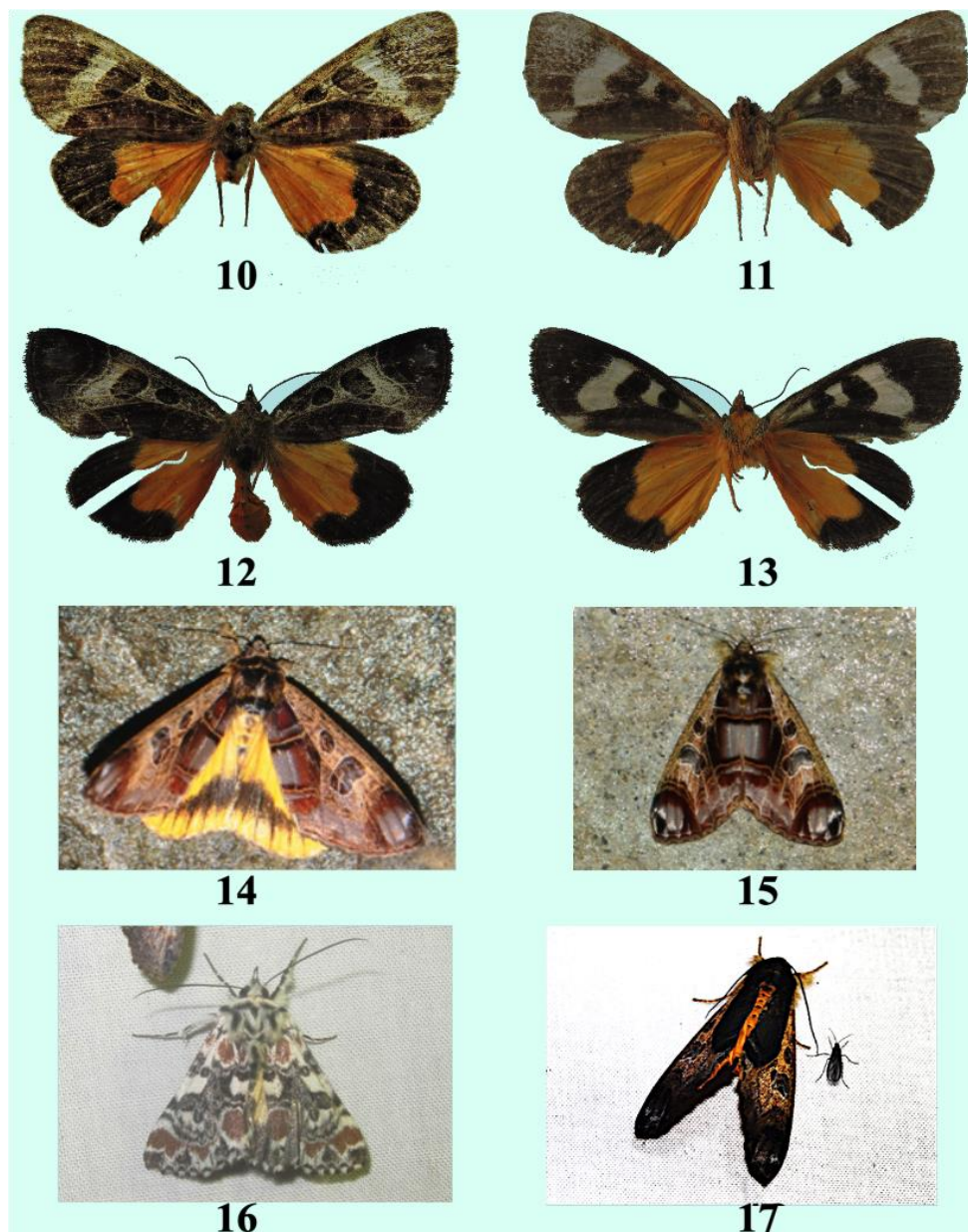
Legends:

FIGURE 1. Map showing north east Indian states from which *Sabanissa* materials were collected and photographed.

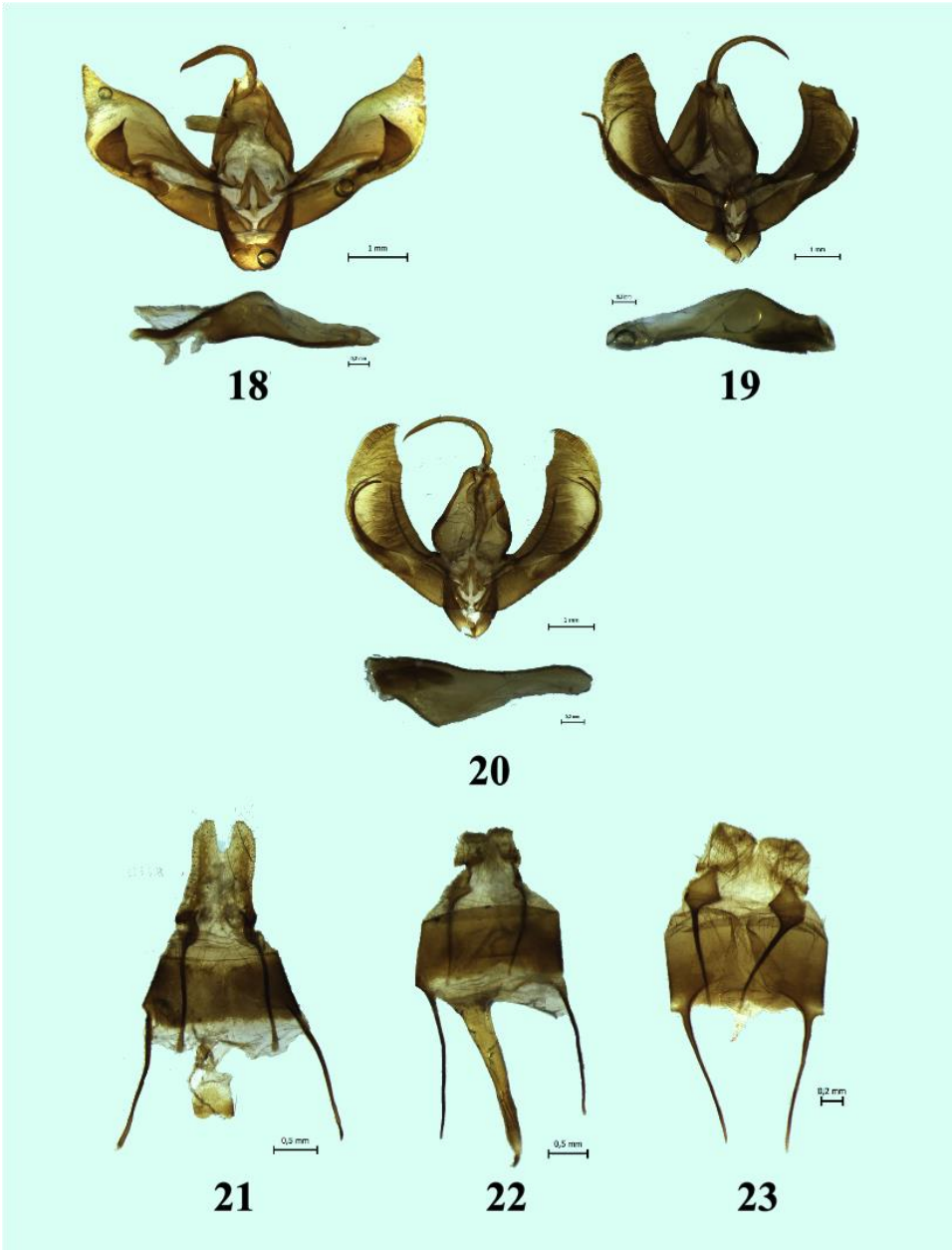




FIGURES 2-9. Adults of *Sarbanissa* spp. 2-3 *S. flavida*; 4-5 *S. catacoloides*; 6-7 *S. transiens*; 8-9 *S. subalba*.



FIGURES 10-17. Adults of *Sarbanissa* spp. 10-11 *S. interposita*; 12-13 *S. bala*; 14-15 *S. insocia*; 16 *S. tricycla*; 17 *S. longipennis*.



FIGURES 18-23. Genitalia of *Sarbanissa* spp.: 18-20, male; 21-23, female. 18 *S. flavida*; 19 *S. transiens*; 20 *S. subalba*; 21 *S. catacoloides*; 22 *S. interposita*; 23 *S. bala*.