

**A new genus is established for *Bombyx lineola* FABRICIUS, 1793,
with systematic notes on the genus *Aloa* WALKER, 1855**

(Lepidoptera, Arctiidae)

by

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Summary: A new genus, *Micraloa* gen. nov. is described for *Bombyx lineola* FABRICIUS, 1793, which was hitherto assigned either to *Aloa* WALKER, 1855, or to *Amsacta* WALKER, 1855. *Micraloa* gen. nov. is characterized by many apomorphies such as the narrow and long uncus, strongly sclerotized tegumen, the short sclerotized valva bearing long apical processes. The genus *Paramsacta* HULSTAERT, 1923 is separated from the genus *Aloa* Wlk. in the structure of male genitalia and in the number of spurs on hind tibia. *Aloa* includes only two species, *A. lactinea* (CRAMER, 1777) and *A. cardinalis* (BUTLER, 1875). The genus *Paramsacta* currently includes the type species *P. marginata* DONOVAN, 1805, and *P. moorei* (BUTLER, 1876), but reasoning from the wing pattern, it should likely include *Aloa collaris* HAMPSON, 1891, *Aloa costalis* WALKER, [1865] 1864, *Aloa corsima* SWINHÖE, 1892, *Aloa gangara* SWINHÖE, 1892, and *Cretonotus flavimargo* HAMPSON, 1894 as well.

The genus *Aloa* WALKER, 1855 was described for four African species (*A. simplex* WALKER, 1855, *A. bifurca* WALKER, 1855, *A. delineata* WALKER, 1855, *A. marginalis* WALKER, 1855) and eleven Asian species (*A. lactinea* (CRAMER, 1777), *A. candidula* WALKER, 1855, *A. marginata* (DONOVAN, 1805), *A. diminuta* WALKER, 1855, *A. bifrons* WALKER, 1855, *A. isabellina* WALKER, 1855, *A. tripartita* WALKER, 1855, *A. biguttata* WALKER, 1855, *A. integra* WALKER, 1855, *A. dentata* WALKER, 1855, and *A. erosa* WALKER, 1855). The type species of this genus, *A. lactinea* (CRAMER, 1777), was designated by MOORE (1883). However, KIRBY (1892) restricted this genus to eight species: *A. candidula* Wlk., *A. rubricosta* (MOORE, 1872), *A. emittens* (WALKER, 1855), *A. diminuta* Wlk., *A. punctistriga* (WALKER, 1855), *A. comma* (WALKER, 1856), *A. flora* SWINHÖE, 1885, and *A. punctivitta* (WALKER, 1855). HAMPSON (1901), who mistakenly considered the type species of *Aloa* Wlk. being *A. lineata* WALKER, 1855, synonymized it with the genus *Diacrisia* HÜBNER, [1819], leaving the *lactinea* species-group in the genus *Amsacta* WALKER, 1855 (type species: *A. marginalis* (WALKER, 1855) from Sierra-Leone in Africa). That concept had been accepted by ROTHSCHILD (1914), STRAND (1919), and other authors before KÔDA (1988), though the problem of the type species was fixed already by WATSON et al. (1980). Later, THOMAS & GOODGER ([1993]) showed that the type species of *Amsacta* Wlk. and *Aloa* Wlk. were not congeneric and treated only 11 Asian and Australian species (*A. albistriga* Wlk., *A. arabicum* (HAMPSON in WALSINGHAM & HAMPSON, 1896), *A. cardinalis* (BUTLER, 1875), *A. flavimargo* (HAMPSON, 1894), *A. collaris* Wlk., *A. corsima* SWINHÖE, 1892, *A. lactinea* (Cr.), *A. marginata* (DONOVAN, 1805)) as congeners of *Aloa*, whereas other eight African and two Asian species (*A. lineola* F. and *A. emittens* (Wlk.)) were considered to belong to *Amsacta* sensu lato. Unfortunately, these authors didn't pay attention to the male genitalia, so the genus *Aloa* Wlk.—in

their sense—remained very polymorphic. This was examined by DUBATOLOV (2004), who erected the monotypic genus *Creataloom* DUBATOLOV for *A. arabicum* (Hmps.). Having examined the male genitalia of oriental genera and species, including some of *Aloa* Wlk. and *Amsacta* sensu lato, from the collection of the Zoological Institute, St.-Petersburg (ZIN), it has been found that there are at least three distinct species groups: *Aloa* Wlk. sensu stricto, *Paramsacta* HULSTAERT, 1923 and a third one, yet undescribed. These groups are treated here as separate genera, with a description of the new genus given below.

Micaloa gen. nov.

Type species: *Bombyx lineola* FABRICIUS, 1793 (colour plate XXIIb, fig. 1).

Male antennae bipectinate, females' ones biserrate. Eyes big, strongly convex, almost hemispherical, naked. Proboscis short, not longer than head diameter. Fore tibia not shortened, and not broadened at apex, the latter bears a strong naked apical spur. Middle and hind tibia with a pair of spurs. Vein R_2 stalked with R_{3+5} (venation type C, see SOTAVALTA, 1964). Forewings yellowish, with a red costal line and a dark stripe behind the cubital stock. This stripe is crossed by light veins, or divided into a few spots between veins. There is an additional short line in the external part of the wing between veins M_2 and M_3 . Hindwings white, sometimes with dark dots on the discal veins and behind the wing apex. The tympanum with a rather large rounded plate, covered by the tympanum slot.

Male genitalia with strongly metamorphosed structures (fig. 1). Uncus long and narrow, with slightly bifurcated apex. Lateral sclerites of the tegumen strongly sclerotized and convex. Costal-basal part of the valva rhomboidal, separated from the main part of the valva by a membrane. This main part of the valva of rounded quadrangular shape, its distal part bears small teeth. Valval costa extending into long processes with an apical club. Juxta quadrangular, noticeably sclerotized and strongly convex longitudinally. Its curved inwards apical angles extending into two long flat processes. Aedeagus curved upwards and extended on its apex, without teeth. Vesica with a single field of small spines.

Besides the type species, which has the dark line on the forewings only shortly crossed by light veins, the new genus also includes *Creatanotos emittens* WALKER, 1855 (= *Aloa flora* SWINHOE, 1885) (col. pl. XXIIb, fig. 2), having the forewings with a dark line split up into a few dark lines widely separated from each other. The latter species was formerly considered a synonym of *Bombyx lineola* F. (see: HAMPSON, 1901; STRAND, 1919), and recently re-validated by THOMAS & GOODGER ([1993]).

Material studied

Micaloa lineola (F.): 1 ♂, N. Indien (Dr. RADDE, ZIN).

M. emittens (Wlk.): 1 ♀, Ceylon (Dr. RADDE, ZIN).

Notes on systematics

Based on the structure of the male genitalia and the wing pattern, all the South Asian and Australian *Aloa* Wlk. and *Amsacta* sensu lato species, which were left in these genera by

THOMAS & GOODGER ([1993]), and after removing *A. arabicum* (HMPS.), can be grouped into three groups. The first one, *Aloa* Wlk. sensu stricto, includes two species: the type species *A. lactinea* (CRAMER, 1777) and *A. cardinalis* (BUTLER, 1875), reasoning from the figure of the male genitalia of the latter species published by KUZNETSOV & STEKOLNIKOV (2001). These moths are large, with reduced pattern on the forewings, consisting of one or two small dots on the discal vein, besides of the purely red costal line (col. pl. XXIIb, figs. 5, 6). The male genitalia of *Aloa* Wlk. (figs. 2, 3) are characterized by the broad triangular uncus, with dorsal longitudinal hollow and split apex. Valvae of both species are very characteristic, they are broadly quadrangular, with a field of teeth or hairs on the apical part of their ventral edge. Juxta short. Moreover, the hind tibia bears two pairs of spurs situated closely to each other.

Most of the species from South-East Asia and Australia assigned to *Aloa* Wlk. by THOMAS & GOODGER ([1993]) are not large and have forewings with a more prominent pattern, consisting of spots on the external part of the wing, often including a red costal line, and in many species a dark line on the cubital stock along the hind edge of the cell (col. pl. XXIIb, figs. 3, 4). Hind tibia only with one apical pair of spurs. The male genitalia of the two studied species, *A. marginata* (DONOVAN, 1805) and *A. moorei* BUTLER, 1876 (figs. 4, 5) have the uncus structure as in *Aloa* Wlk. sensu stricto. Nevertheless, the valva shape is clearly distinct, the valva are slightly elongate, with two apical processes, of which the costal is largest, and a small prominence on the inner side. Such a type of valva is characteristic of many other Spilosomini genera, but is most similar to *Alphaea* WALKER, 1855 (type species: *A. fulvohirta* WALKER, 1855). These valvae do not bear teeth or hairs. The juxta is quadrangular, but strongly elongated, not as in *Aloa* Wlk. For this species group exists a valid generic name, *Paramsacta* HULSTAERT, 1923, with *Paramsacta pura* HULSTAERT, 1923 (a junior synonym of *Phalaena marginata* DONOVAN, 1805) as the type species. The position of *A. albistriga* WALKER, 1864 remains yet uncertain, because it has a quite peculiar pattern on the forewing, with many dark stripes between veins.

The third group consists of two sibling species, *Micraloa lineola* (FABRICIUS, 1793) from Hindostan, and *Micraloa emittens* (WALKER, 1855) from Ceylon and South Hindostan, which are here considered in a newly erected genus. These species are moderately small, compared to the species of *Aloa* Wlk. and *Paramsacta* HULSTAERT. The cubital line on the forewings is situated not on the vein, but just behind it and is separated by light veins (col. pl. XXIIb, figs. 1, 2). The male genitalia (figs. 1, 2) are very strongly transformed, compared to other Spilosomini genera. Uncus very narrow and long (not wide), and its apical split transformed into a small fork. The valva of *Micraloa* gen. nov. are strongly sclerotized, short and with long apical

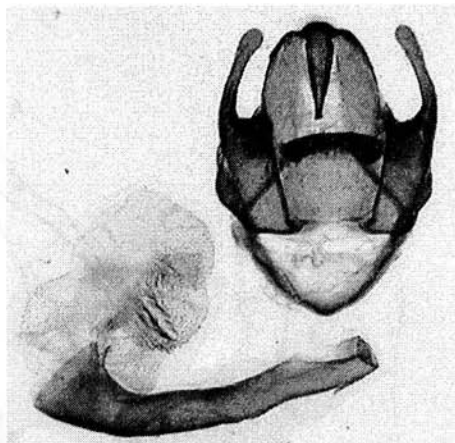


Fig. 1: Male genitalia of *Micraloa lineola* (FABRICIUS, 1793), Nord Indien, Dr. RADDE (ZIN).

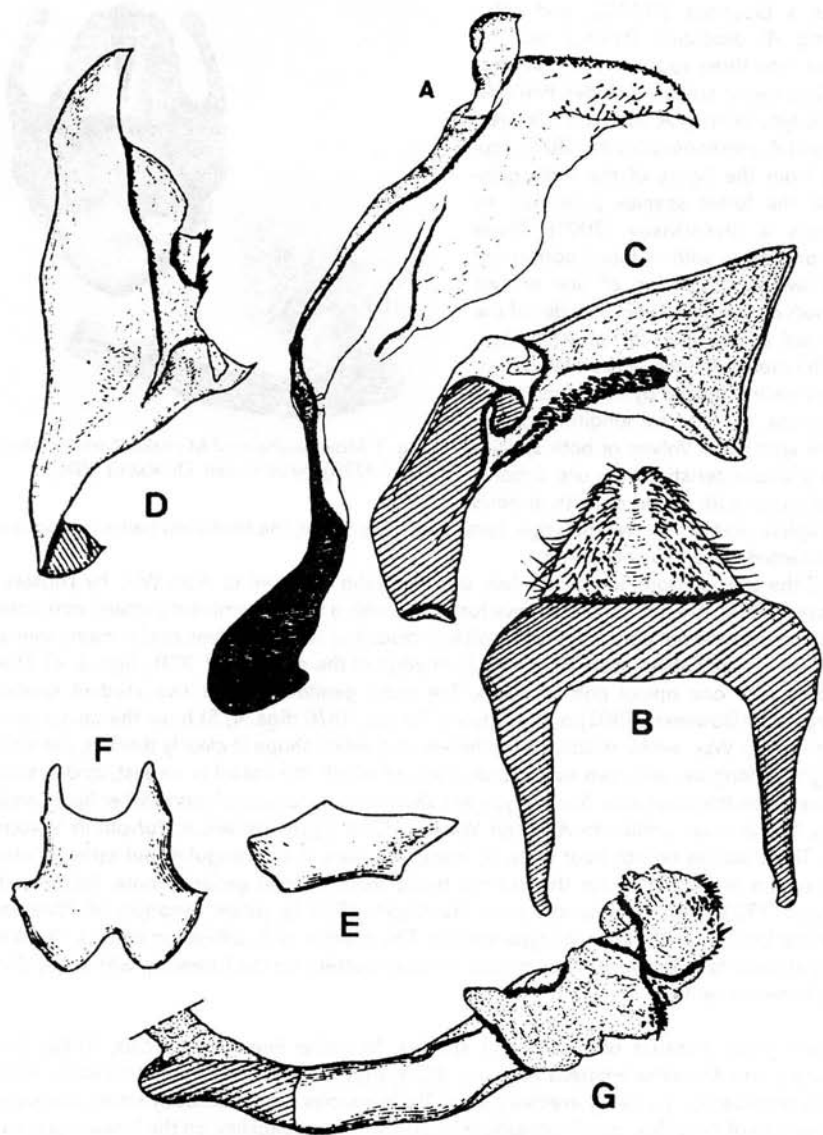


Fig. 2: Male genitalia of *Aloa lactinea* (CRAMER, 1777), from: KÔDA, 1988. A - uncus, tegumen and saccus, lateral view; B - uncus, dorsal view; C - valva, inner side; D - valva, dorsal view; E - juxta, lateral view; F - juxta, ventral view; G - aedeagus.

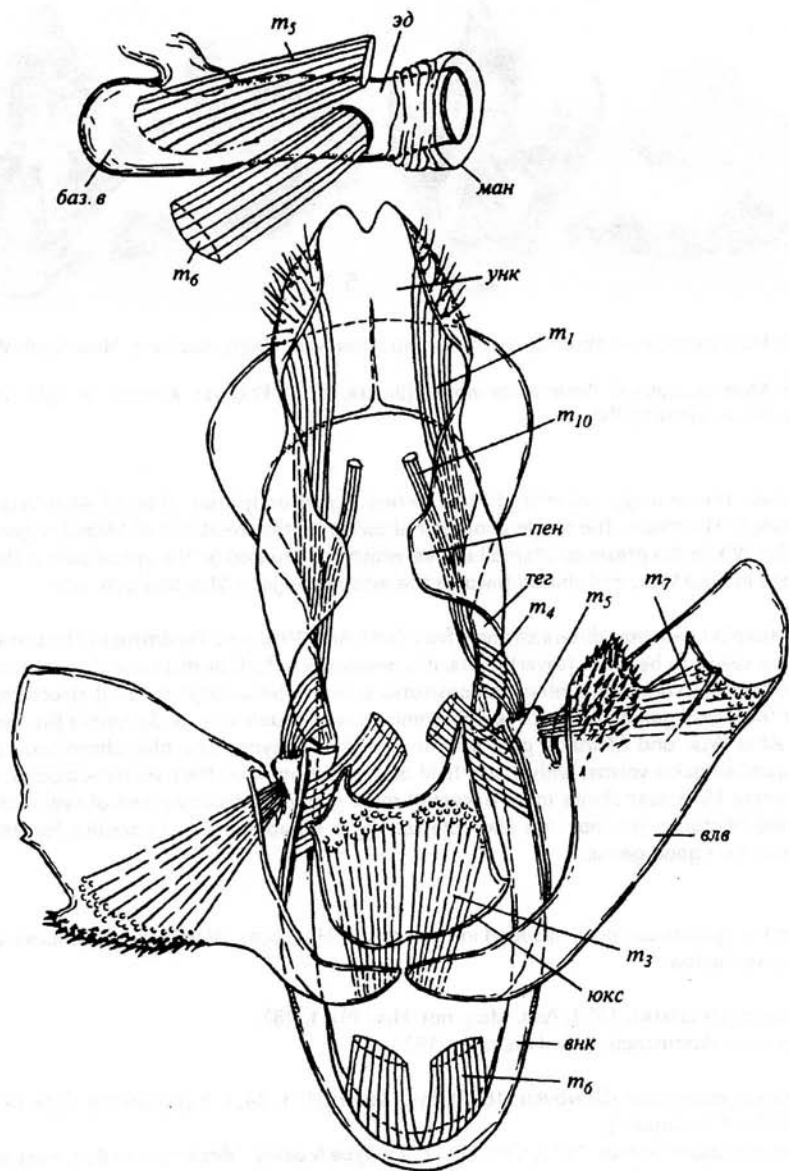


Fig. 3: Male genitalia of *Aloa cardinalis* (BUTLER, 1876), from: KUZNETZOV & STEKOLNIKOV (2001). General view (down) and aedeagus (up).

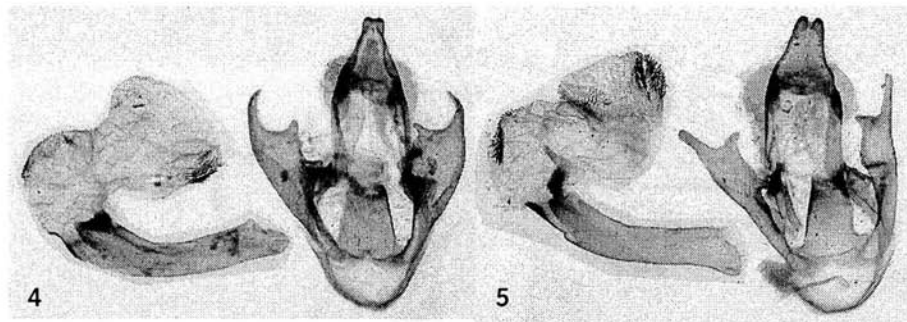


Fig. 4: Male genitalia of *Paramisacta marginata* (DONOVAN, 1805), Australia, New South Wales (ZIN).

Fig. 5: Male genitalia of *Paramisacta moorei* (BUTLER, 1876), Pakistan, Karachi, on light, 15.VII. 1960, coll. A. WHEED (ZIN).

processes. The strongly sclerotized juxta differs significantly from that of *Aloa* Wlk. and *Paramisacta* HULSTAERT. The single character showing certain relations of *Micraloa* gen. nov. and *Aloa* Wlk. is the presence of small spines, which are situated on the apical part of the ventral edge in *Aloa* Wlk. and shifted towards the external edge in *Micraloa* gen. nov.

Thus, *Micraloa* gen. nov. differs strongly from both *Aloa* Wlk. and *Paramisacta* HULSTAERT and its status seems to be clear. Nevertheless, it is necessary to further discuss a distinct status of *Paramisacta* HULSTAERT. The latter demonstrates a most plesiomorphic valval structure, very similar to several genera of the tribe Spilosomini, like *Alphaea* Wlk. or *Spilarctia* Btl. Furthermore, *Aloa* Wlk. and *Micraloa* gen. nov. have a distinct synapomorphic character, viz. the short quadrangular valvae, with a nice field of teeth or hairs on their ventral-apical part. As *Paramisacta* HULSTAERT shows more ancestral male genitalia structure (see above) and *Aloa* Wlk. and *Micraloa* gen. nov. are characterized by a synapomorphy, I consider *Paramisacta* HULSTAERT as a good genus.

A list of the species currently included in *Paramisacta* HULSTAERT, *Aloa* Wlk. and *Micraloa* gen. nov. is given below:

Paramisacta HULSTAERT, 1923; Ann. Mag. nat. Hist. (9)11: 187.

Type species: *Paramisacta pura* HULSTAERT, 1923.

Paramisacta marginata (DONOVAN, 1805); Ins. New Holl.: t. 34, f. 2 (*Phalaena*). Type locality: New Holland (Indonesia).

= *Areas roseicostis* BUTLER, 1875; Cist. Ent. 2: 23. Type locality: "Rockingham Bay, Australia".

= *Areas punctipennis* BUTLER, 1876; Ann. Mag. nat. Hist. (4)18: 126. Type locality: "Cape York".

= *Paramisacta pura* HULSTAERT, 1923; Ann. Mus. nat. Hist. (9)11: 187-188. Type locality: "Okaba" [New Guinea, Irian Jaya].

= *Amsacta eurymochla* TURNER, 1927; Pap. & Proc. Roy. Soc. Tasm. 1926: 119. Type locality: "Tasmanien ... Beaconsfield".

New Guinea, Fergusson Is., Loisiade Islands, Woodlark Is. (Papua-New Guinea); Australia, Tasmania.

Paramsacta moorei (BUTLER, 1876); Cist. Ent. 2: 23 (Areas). Type locality: "Almorah, N. India".

= *Aloa sara* SWINHOE, 1889; Proc. Zool. Soc. London 1889: 404. Type locality: "Karachi".

India, Pakistan.

?*Paramsacta collaris* (HAMPSON, 1891), Ill. Het. Br. Mus. 8: 54, t. CXL, fig. 18 (*Aloa*). Type locality: "the Nilgiri District of Southern India".

India (STRAND, 1919). ?China: Hainan (ROTHSCHILD, 1910; STRAND, 1919).

?*Paramsacta costalis* (WALKER, [1865] 1864); List Het. Br. Mus. 31: 301 (*Aloa*). Type locality: "North Australia".

North and North-West Australia (TURNER, 1940).

?*Paramsacta corsima* SWINHOE, 1892; Cat. Het. Mus. Oxfrd. 1892: 171-172, t. 4, f. 1 (*Aloa*). Type locality: "Port Essington" [Queensland, Australia].

North-East Australia. [bona spec. - THOMAS & GOODGER, 1992 [1993]].

?*Paramsacta flavimargo* (HAMPSON, 1894); Moths India 2: 27 (*Cretonotus flavimargo*). Type locality: "Bhâmo, Burma".

Burma.

?*Paramsacta gangara* SWINHOE, 1892; Cat. East. Austral. Lep. Het. Colln Oxf. Univ. Mus 1: 171, pl. 4, f. 2 (*Aloa*). Type locality: "Australia".

West Australia (TURNER, 1940). According to THOMAS & GOODGER ([1993]) a synonym of *P. marginata* (DON.), while EDWARDS (1996) considered it as good species.

Aloa WALKER, 1855, List. Specimens lepid. Insects Colln Br. Mus. 3: 699.

Type species: *Phalaena lactinea* CRAMER, 1777, designated by MOORE, [1883] 1882-1883, Lepid. Ceylon 2: 74.

Aloa cardinalis (BUTLER, 1875); Cist. Entom. 2: 22 (Areas). Type locality: "Philippine Islands". Philippines, Central Indonesia (STRAND, 1919).

A. c. celebensis (ROTHSCHILD, 1910); Novit. Zool. 17 (2): 158 (*Am.[sacta] cardinalis celebensis*). Type locality: "Celebes".

Indonesia: Sulawesi.

A. c. luteomarginata (ROTHSCHILD, 1910); Novit. Zool. 17 (2): 158 (*Am.[sacta] cardinalis luteomarginata*). Type locality: "Oinainisa, Timor, ..., type; Letti, ..., Moa, Larat, Tenimber Islands, Dammer, ...; Larentuka".

South Central Indonesia, East Timor.

A. c. reducta (ROTHSCHILD, 1910); Novit. Zool. 17 (2): 158 (*Am.[sacta] cardinalis reducta*). Type locality: "Tomia, Toekan Besi Islands".

Indonesia: Toekan Besi Islands.

Aloa (Aloa) lactinea (CRAMER, 1777), *Uitlandsche Kapellen* (Papillons exot.) 2: 58, 149, pl. 133, fig. D (*Phalaena*). Type locality: "Batavia" [Indonesia, Java: Djakarta].
= *B.[ombyx] ... sanguinolenta* FABRICIUS, 1793; *Ent. Syst.* 3 (1): 473-474. Type locality: "India orientali".
= *Aloa marginata* MOORE, 1883; *Proc. Zool. Soc. London* 1883: 15-16, t. 5, f. 1. Type locality: "Nepal".
= *Rhodogastria frederici* KIRBY, 1892; *Syn. Cat. Lep. Het.* 1: 223. Type locality: "Nepal". Replacement name for *Aloa marginata* MOORE, 1883.
= *Cretonotus negritus* HAMPSON, 1894; *Moths India* 2: 28. Type locality: "Khásis" [Assam, India] (synonymized by THOMAS & GOODGER, [1993]).
South-East Afghanistan, Pakistan, India, Sri Lanka, Nepal, China, Korea, Japan, Indochina, Philippines, Indonesia.

Micraloa DUBATOLOV gen. nov.

Type species: *Bombyx lineola* FABRICIUS, 1793.

Micraloa lineola (FABRICIUS, 1793); *Ent. Syst.* 3 (1): 465-466 (*B.[ombyx] ... lineola*). Type locality: "India orientali".

= *Spilosoma punctistriga* WALKER, 1855; *List Specimens lepid. Insects Colln. Br. Mus.* 3: 676. Type locality: "North India".

= *Aloa candidula* WALKER, 1855; *List Specimens lepid. Insects Colln. Br. Mus.* 3: 704. Type locality: "Nepaul" + "Ceylon".

= *Aloa diminuta* WALKER, 1855; *List Specimens lepid. Insects Colln. Br. Mus.* 3: 705. Type locality: "North India".

= *Spilosoma strigata* WALKER, 1869; *Char. Lep. Het.:* 10. Type locality: originally not stated. Punjab [HAMPSON, 1901].

= *Cretonotus rubricosta* MOORE, 1872; *Proc. Zool. Soc. London* 1872: 573. Type locality: "Manipuri, North-west India ...; Bombay."

= *Aloa insolata* SWINHOE, 1889; *Proc. Zool. Soc. London* 1889: 404-405, t. 43, f. 15. Type locality: "Thyetmeyo".

= *D.[iacrisia] felderi* ROTHSCHILD, 1910; *Novit. Zool.* 17 (2): 124. Type locality: "Kotegurh, N. India."

= *Estigmene octomaculata* ROTHSCHILD, 1933; *Ann. Mag. Nat. Hist.* (10)11: 185. Type locality: "Solani" [Solane] [THOMAS, 1992].

India, Burma.

Micraloa emittens (WALKER, 1855); *List Specimens lepid. Insects Colln. Br. Mus.* 3: 638-639 (*Cretonotus*). Type locality: "Ceylon" + "North India".

= *Aloa flora* SWINHOE, 1885; *Proc. Zool. Soc. London* 1872: 296, t. 20, f. 5. Type locality: "Bombay".

India, Sri Lanka.

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Explanation of colour plate XXIb (p. 487):

Fig. 1: *Micraloa lineola* (FABRICIUS, 1793), ♂, N.[ord] Indien, Dr. RADDE (ZIN).

Fig. 2: *Micraloa emittens* (WALKER, 1855), ♀, Ceylon, Dr. RADDE (ZIN).

Fig. 3: *Paramsacta marginata* (DONOVAN, 1805), ♂, N.[ew] S.[outh] Wales (ZIN).

Fig. 4: *Paramsacta moorei* (BUTLER, 1876), ♂, [Pakistan], Karachi, on light, 15.VII.1960, coll. A. WHEED (ZIN).

Fig. 5: *Aloa lactinea* (CRAMER, 1777), from: SEITZ, 1910.

Fig. 6: *Aloa cardinalis* (BUTLER, 1875), from: ROTHSCHILD in SEITZ, 1914.

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Colour plate XXla-c

