



Research Article

REVISION OF THE GENUS *CNAPHALOCROCIS* (LEPIDOPTERA: PYRALOIDEA: CRAMBIDAE) OCCURRING ON RICE IN TAMIL NADU, INDIA

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Abstract- Studies revealed the presence of six species of genus *Cnaphalocrocis* Lederer viz., *C. medinalis* (Guenee), *C. patnalis* (Bradley), *C. ruralis* (Walker), *C. trapezalis* (Guenee), *C. exigua* (Butler) and *C. poeyalis* (Boisduval) (Lepidoptera: Crambidae) reported in rice in Tamil Nadu, India. In this paper, mentioned insect pest species have been described taxonomically and illustrated with diagnostic characters. *Cnaphalocrocis* is used as a synonym of *Marasmia*.

Keywords- Crambidae, *Cnaphalocrocis*, Genitalia, rice, Tamil Nadu

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Introduction

Rice leaffolders (*Cnaphalocrocis* spp.) and Rice stem borers (*Scirpophaga* spp. and *Chilo* spp.) are the two important lepidopteran pest group in rice, which gain major pest status in recent years in South and Southeast Asian countries. Leaf folder complex comprises eight species viz., *Cnaphalocrocis medinalis* Guenee, *Marasmia* (= *Susumia*) *patnalis* Bradley, *M. exigua* Butler, *M. bilinealis* Hampson, *M. ruralis* Walker, *M. suspicalis* Walker, *M. trapezalis* Guenee, and *M. venialis* Guenee [2,4,20,21]. In addition, *Bradina admixialis* (Walker) was also reported to be a pest of rice along with leaffolders [7,15,17,24]. Members belonging to the two genera differ from *Cnaphalocrocis* spp. in forewing venation. In *Cnaphalocrocis* forewing has R₂ and R₁ veins (Veins 10 and 11) stalked and R₂ set close to trunk of R₄ and R₃ (Vein 8 and 9). But in *Marasmia*, forewing has R₂ and R₁ free [10]. Several studies on illustrations of wing markings of widespread leaffolder species [1,13,26]. The formulation of keys of many pyralid species including *M. trapezalis* from their external morphological characters like wing markings, wing span and genitalia characters like aedeagus, cornuti and saccus shape were presented [6]. The brief account on *Marasmia* generic complex of leaf folding defoliator's viz., *M. bilinealis*, *M. ruralis*, *M. suspicalis* and *C. medinalis* of rice in South East Asia and differentiated from *M. patnalis* based on wing markings and morphological characters of their external genitalia [4]. The leaf folder species from Kerala which were belonging to genera *Bradina*, *Cnaphalocrocis* and *Marasmia* and devised their identification keys [20]. *Cnaphalocrocis* was used as a synonym of *Marasmia* in updated data in LEPINDEX [34]. The diagnostic characteristics like wing markings, wing span, color, size and abdomen with their taxonomic status of genus *Cnaphalocrocis* were discussed in this paper.

Materials and Methods

Adult moths were collected with the help of light trap fitted with mercury vapour lamp (160 Watt) and from the rice crop using sweep net from different college's viz., Agriculture College and Research Institute (AC & RI) located at Killikulam, Trichy and Madurai, Tamil Nadu Rice Research institute (TRRI), Aduthurai; Rice Research Station (RRS), Thirur; Agriculture Research Station (ARS)

Thirupathisaram and Paddy Breeding Station (PBS) of Tamil Nadu Agricultural University (TNAU), Coimbatore. The collected specimens (six species of genera *Cnaphalocrocis*) were killed by using Ethyl acetate 70 per cent. These moths were stretched, pinned, labeled, identified, preserved in insect collection boxes and deposited in the Insect Biosystematics Laboratory, Department of Agricultural Entomology, TNAU, Coimbatore. The insect pests were identified as *Cnaphalocrocis medinalis* (Guenee), *C. patnalis* (Bradley), *C. ruralis* (Walker), *C. trapezalis* (Guenee), *C. exigua* (Butler) and *C. poeyalis* (Boisduval) based on available literature. The collected specimens were examined taxonomically and studied diagnostic characters like wing markings, wing span, color, size and abdomen including genitalia. The genitalia slides have been prepared for both male and female specimens collected [27]. To write the taxonomic descriptions on various morphological characters like wing markings, abdomen markings [10,14] and external genitalia characters like aedeagus, signum of both sexes [4,6,21] has been followed. The images of adults were captured using Canon- EOS C50D and Sony DSC-W580/BCE 32 16.0 megapixel camera. Getner India digital zoom microscope (2x-30x) and Leica MZ 16 Stereo zoom microscope-3.17 version were used for capturing images. Illustrations were made using a drawing tube fitted with a camera lucida. Female of *C. poeyalis* was not used in study.

Results

Re-description of species

1. *Cnaphalocrocis medinalis* (Guenee)

[Fig-1-5, 15-16, 27]

Botys rutilalis [33].

Botys iolealis [33].

Botys nурсialis [33]. Type locality: Australia.

Botys acerrimalis [33].

Godara jolinalis [16].

Cnaphalocrocis medinalis [9].

Salbia medinalis [9]. Type locality: East India (*Indes Orientalis*).

Description

[Fig-4-5]

Medium sized moth. Wings span about 16–18mm in male and 18–19mm in female. Forewing triangular with costal and outer areas brownish yellow in female; male with dark brown patch and shining and roconial scales along mid costa of forewing and cilia also brownish colour. Forewing with sub-terminal, antemedian and postmedian lines prominent in both sexes. Postmedian line of forewing diagonal and clear comma like in female. In hind wing of female, median line very short, comma like and curved outside. Abdomen ochreous and covered with scales and white towards extremity in male. Anal tuft black, striped with white patches on both sides of anal extremity in male and pointed to end; anal tuft ochreous yellow and also striped with white patches on both sides of anal extremity and blunt to the end in female. Legs covered with white scales in both sexes. Fore tibia with spur-like projection called epiphysis; mid tibia with pair of apical spurs; hind tibia possesses two pairs of spurs, first situated close to the middle and the second situated apically in both sexes.

Male genitalia

[Fig-1-2, 15-16]

Uncus short, weakly sclerotized and obtuse with two cylindrical oval processes covered with transverse row of short spines. Tegumen short and densely setose. Valva broadly ovate, semi-membranous and inner surface sparsely clothed with fine and loosely attached setae, medially near base setal batches, apical end of valva with median spine. Vinculum with prominent coremata and very long hair-like setae. Saccus U-shaped and sacculus less sclerotized. Aedeagus short, slender and sclerotized, dense cornuti spiked on vesica apically.

Female genitalia

[Fig-3, 27]

Anal papillae weakly sclerotized with rounded apex and densely setose. Apophyses weak, posterior pair approximately half length longer than anterior pair. Ostium wide and moderately sclerotized, minute spiculated and sclerotized. Ostium bursae strongly spiculated near antrum but less spiculated towards bursa copulatrix. Bursa copulatrix spiculated and elongated with a thorn-like signum surrounded by strongly granular scobination.

Material examined: 1♂, 1♀, TRRI, Aduthurai, Tamil Nadu, 8°42'N, 77°27'E, AMSL-90 m, 10 Sept 2014, V. Saini, mc 1120, ♂ genitalia slide MC 0244, ♀ genitalia slide MC 0245. 1♂, 1♀, AC & RI, Killikulam, Tamil Nadu, 8°46'N, 77°42'E, AMSL- 40 m, 29 Nov 2014, V. Saini, mc 1124, ♂ genitalia slide MC 0255, ♀ genitalia slide MC 0256. 1♂, 2♀, ARS, Thirupathisaram, Tamil Nadu, 8.17°N, 77.43°E, AMSL- 40 m, 01 Dec 2014, V. Saini, mc 1155, ♂ genitalia slide MC 0265, ♀ genitalia slide MC 0266, MC 0267. 1♂, AC & RI, Trichy, Tamil Nadu, 10°15' to 11°2'N, 78°10' to 79°5'E, AMSL- 90 m, 6 Jan 2015, V. Saini, mc 1206, ♂ genitalia slide MC 0285. 1♀, AC & RI, Madurai, Tamil Nadu, 9° 58'N, 78° 12'E, AMSL- 976 m, 25 Jan 2015, V. Saini, mc 1253, ♀ genitalia slide MC 0297. 1♂, RRS, Tirrur, Tamil Nadu, 12°10' to 13°15'N, 79°15' to 80°20'E, AMSL- 39.47 m, 15 Feb 2015, V. Saini, mc 1284, ♀ genitalia slide MC 0324. 1♂, 1♀, Paddy Breeding Station, TNAU-Coimbatore, 11°0'N, 77°0'E, AMSL- 426.72 m, 24 Feb 2015, V. Saini, mc 1320, ♂ genitalia slide MC 0355, ♀ genitalia slide MC 0356. Deposited in Insect Biosystematics Laboratory, TNAU, Coimbatore.

Comments

This is a major leafroller species, which is widely distributed on rice crop in Tamil Nadu.

Distribution

Afghanistan, Australia, Bangladesh, Bhutan, Cambodia, China, Fiji, Hong Kong, India, Indonesia, Java, Japan, Korea, Malaysia, Madagascar, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Singapore, Solomon Islands, Sri Lanka, Taiwan, Thailand and Vietnam.

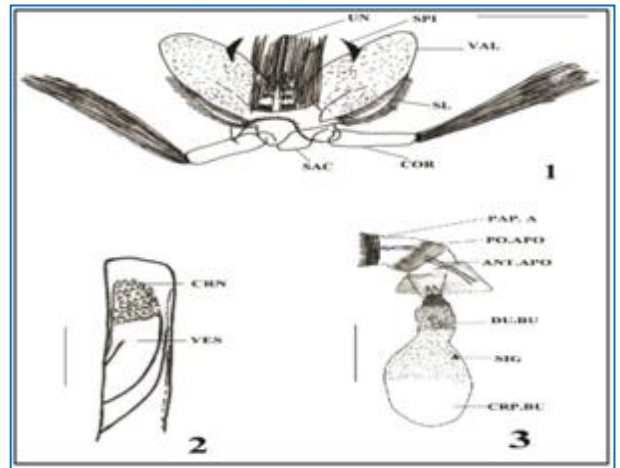


Fig-1-3. (Scale bar – 0.2 mm). Male and Female genitalia of *Cnaphalocrocis medinalis*.

2. *Cnaphalocrocis patnalis* (Bradley)

[Fig-6-7, 17-18, 28]

Marasmia patnalis [4]. Type locality: Sri Lanka.

Description

[Fig-6-7]

Both sexes are similar in coloration and wing markings. Wings span 16–17mm in female and 18mm in male. Forewing pale yellow and greyish fuscous along basal three- quarter of costa and distal margin suffused. Forewing having broad marginal, antemedian and postmedian transverse line purplish fuscous, antemedian line shallowly outward curved below costa, straightening and tapering dorsally, postmedian line arising from end of costal infuscation; inner edge of marginal line curving towards postmedian line costally, subbasal line dark fuscous and sub apical line pale fuscous. Abdomen white, extensively ochreous yellow dorsally covered with scales. In male, seventh segment marked with pair of rectangular black patches on anterior margin sub-dorsally, eighth segment with longitudinal black median and lateral streaks white, anal tuft ochreous. In female, eighth segment with thick black median streak dorsally, anal tuft ochreous yellow and striped with white patch. Legs white and covered with scales. Fore tibia covered with ochreous hairs and spur-like projection called epiphysis. Mid tibia and hind tibia possesses pair and two pairs of spurs, respectively.



Fig-4-14. (Scale bar– 2mm). Adults of *Cnaphalocrocis* spp. 4. *C. medinalis* (male); 5. *C. medinalis* (female); 6. *C. patnalis* (male); 7. *C. patnalis* (female); 8. *C. ruralis* (male); 9. *C. ruralis* (female); 10. *C. trapezalis* (female); 11. *C. trapezalis* (male); 12. *C. exigua* (male); 13. *C. exigua* (female); 14. *C. poeyalis* (male).

Male genitalia

[Fig-17-18]

Uncus short, membranous and two oblong oval processes covered with sclerotized transverse row of short spines. Tegumen short and setose. Valva broadly ovate, semi-membranous and inner surface with sparsely attached setae and medially setal batches near base. Vinculum narrow with prominent coremata of very long hair-like setae on each side. Saccus U-shaped and sacculus weakly sclerotized. Aedeagus moderately stout, cylindrical and vesica covered with cornuti fully and dense apically.

Female genitalia

[Fig-28]

Anal papillae weakly sclerotized, rounded apically and surface enclosed with long hairs. Apophyses weak, posterior pair approximately half of the length of anterior apophyses. Ostium bursae wide and moderately sclerotized, broad antrum which is depressed laterally little before joining ductus bursae; ductus bursae wider than antrum and strongly covered with spicules but less spiculose towards bursa copulatrix and constricted and membranous as it opens in to bursa. Bursa copulatrix elongate, oval, membranous with small thorn-like signum surrounded by dense field of scobinations.

Material examined: 1♂, 1♀, TRRI, Aduthurai, Tamil Nadu, 8°42'N, 77°27'E, AMSL- 90 m, 21 Oct 2014, V. Saini, mc 1320, ♂ genitalia slide MC 0544, ♀ genitalia slide MC 0545. 1♀, AC & RI, Killikulam, Tamil Nadu, 8°46'N, 77°42'E, AMSL- 40 m, 23 Sept 2014, V. Saini, mc 1424, ♀ genitalia slide MC 0651. 1♂, ARS, Thirupathisaram, Tamil Nadu, 8.17°N, 77.43°E, AMSL- 40 m, 15 Nov 2014, V. Saini, mc 1525, ♂ genitalia slide MC 0725. 1♂, 1♀, AC & RI, Trichy, Tamil Nadu, 10°15' to 11°2'N, 78°10' to 79°5'E, AMSL- 90 m, 28 Jan 2015, V. Saini, mc 1760, ♂ genitalia slide MC 0858, ♀ genitalia slide MC 0859. 1♂, 1♀, AC & RI, Madurai, Tamil Nadu, 9° 58'N, 78° 12' E, AMSL- 976 m, 24 Feb 2015, V. Saini, mc 1770, ♂ genitalia slide MC 0927, ♀ genitalia slide MC 0928. 2♂, RRS, Tirur, Tamil Nadu, 12°10' to 13°15'N, 79°15' to 80°20'E, AMSL- 39.47 m, 02 Mar 2015, V. Saini, mc 1840, ♂ genitalia slide MC 0995, MC 996. 1♂, 1♀, Paddy Breeding Station, TNAU-Coimbatore, 11°0'N, 77°0'E, AMSL- 426.72 m, 12 Mar 2015, V. Saini, mc 1956, ♂ genitalia slide MC 1055, ♀ genitalia slide MC 1056. Deposited in Insect Biosystematics Laboratory, TNAU, Coimbatore.

Comments

This is a commonly occurring species of leafroller on rice crop in Tamil Nadu.

Distribution

South-East Asia and South Asia, Sri Lanka, India, Malaysia, Indonesia and the Philippines.

3. *Cnaphalocrocis ruralis* (Walker)

[Fig-8-9, 19-20, 29]

Botys ruralis [33]. Type locality: Sri Lanka.

Description

[Fig-8-9]

Small to medium sized moth. Wings span 14mm in female and 13–15mm in male. Forewing with white and black spots or minute black strigulae along costa; 9–10 black strigulae on female forewing which is reduced in male. The forewing markings are similar in male of *C. ruralis* and *C. poeyalis* and differ only by genitalia; androconial scales on forewing are more prominent in *C. poeyalis* than *C. ruralis*. Forewing with broad marginal, antemedian and postmedian transverse line, antemedian line shallowly outward curved below costa, straightening and tapering dorsally; postmedian line arises from end of costal infuscation, inner edge of marginal line curving towards postmedian line costally and apical angle of both wing fuscous. Abdominal markings present in both sexes, male with elongated abdominal tip without markings while female has two short diagonal black bands that converged basally, anal tuft ochreous. Legs white and possess scales. Fore tibia with spur-like projection called epiphysis. Mid tibia and hind tibia possesses

pair and two pairs of spurs, respectively.

Male genitalia

[Fig-19-20]

Uncus slender, tubular, membranous and two oval processes covered with transverse dense row of short spines. Tegumen short and fringed with long hairs. Valvae petal-like and divided as two lobes at the corona, lobes rounded, one broader than other and appears as irregularly U-shaped with a valley between the lobes. Spur-like costa present at the upper margin of sacculus. Saccus broadly V-shaped. Coremata absent. Aedeagus slender, tubular and 8–9 cornuti at the tip of the vesica in spiral manner.

Female genitalia

[Fig-29]

Anal papillae weakly sclerotized and surface covered with long hairs and rounded apex. Anterior apophyses one and half times longer than posterior apophyses. Antrum is constricted and somewhat shield-shaped as it enters ductus bursae and ductus bursae weakly spiculated, gradually broadens and merges with bursa copulatrix. Corpus bursae membranous and bulbous. Signum thorn-like with sparse surroundings of minutely spined granulations.

Material examined: 1♂, 1♀, TRRI, Aduthurai, Tamil Nadu, 8°42'N, 77°27'E AMSL- 90 m, 14 Oct 2014, V. Saini, mc 1993, ♂ genitalia slide MC 1034, ♀ genitalia slide MC 1035. 1♂, ARS, Thirupathisaram, Tamil Nadu, 8.17°N, 77.43°E, AMSL- 40 m, 24 Oct 2014, V. Saini, mc 2010, ♂ genitalia slide MC 1124. 1♀, AC & RI, Madurai, Tamil Nadu, 9° 58'N, 78° 12' E, AMSL- 976 m, 05 Nov 2014, V. Saini, mc 2176, ♀ genitalia slide MC 1152. 1♂, 1♀, Paddy Breeding Station, TNAU-Coimbatore, 11°0'N, 77°0'E, AMSL- 426.72 m, 02 Feb 2015, V. Saini, mc 2214, ♂ genitalia slide MC 1195, ♀ genitalia slide MC 1196. Deposited in Insect Biosystematics Laboratory, TNAU, Coimbatore.

Comments

This species has very close resemblance with *Cnaphalocrocis poeyalis* and differs only by genitalia. One of the important leafroller species in Tamil Nadu.

Distribution

South-East Asia and South Asia, Sri Lanka, India, Malaysia, Indonesia and the Philippines.

4. *Cnaphalocrocis trapezalis* (Guenee)

[Fig-10-11, 21-22, 30]

Salbia trapezalis [9]. Type locality: Sri Lanka.

Botys convectalis [33]. Type locality: India.

Botys creonalis [33]. Type locality: Dominican Republic, Santo Domingo.

Botys neoclesalis [33]. Type locality: South Africa.

Botys suspicalis [33]. Type locality: Sri Lanka.

Bradina andresi [25].

Cnaphalocrocis bifurcalis [30]. Type locality: Indonesia, Celebes.

Dolichosticha perinephes [22]. Type locality: Fiji.

Epimima trapezalis (Guenee), [32].

Marasmia trapezalis (Guenee), [6,10,29]. Type locality: Sierra Leone.

Rovanoa creonalis (Walker), [23].

Description

[Fig-10-11]

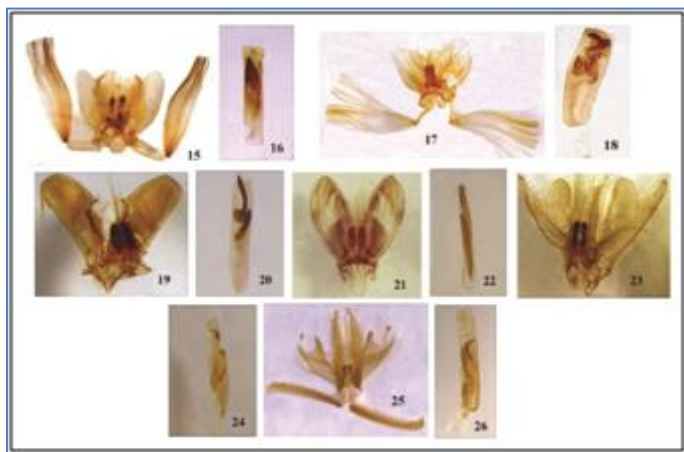
Medium sized moth. Wings span 19mm in female and 20mm in male. Both wings pale ochreous with fuscous brown. Forewing with costal and outer areas suffused with brown, distinct subbasal and antemedial lines, dark fuscous area at basal postdiscal cell more prominent in male than female. Forewing having broad marginal, antemedian and postmedian line, antemedian line shallowly outward curved more below costa, postmedian line arising from end of costal infuscation, inner edge of marginal line curving towards postmedian line costally. In hindwing median line very prominent, dark and long, post medial line from costa sometimes

almost connected with medial line, outer area suffused with brown. Two black spots present on eighth segment in both sexes, anal tuft ochreous white in female, below spots bunches of ochreous white hairs present. Legs are generally white. Fore tibia covered with ochreous hairs and spur-like projection called epiphysis. Mid tibia and hind tibia possesses pair and two pairs of spurs, respectively.

Male genitalia

[Fig-21-22]

Uncus short, fragile, flattened and membranous; two elongate oval bodies covered the uncus with short stiff hairs. Tegumen reduced. Vinculum laterally forming hair-like scales. Valva long, ovate, covered with long hairs from margins and internally. Saccus V-shaped and sacculus narrowly rolled inwardly at middle. Aedeagus long, slender and straight, vesica armed with two predominantly visible strong, sclerotized, sickle-like large cornuti.



Figs. 15-26. (Scale bar- 0.2 mm). Male genitalia of *Cnaphalocrocis* spp. 15,16. *C. medinalis*; 17,18. *C. patnalis*; 19,20. *C. ruralis*; 21,22. *C. trapezalis*; 23, 24. *C. exigua*; 25, 26. *C. poeyalis*.

Female genitalia

[Fig-30]

Anal papillae well sclerotized, membranous basally and surface covered with long hairs, apex rounded. Apophyses weak, posterior pair approximately half of length of anterior apophyses. Ostium bursae transverse and membranous. Ductus bursae short, flattened and sclerotized with two spots near antrum. Bursa copulatrix bulbous, membranous, posterior three basal quarters studded with small spines. Signum very small with scobinate plate.

Material examined: 1♂, 1♀, AC & RI, Madurai, Tamil Nadu, 9° 58' N, 78° 12' E, AMSL- 976 m, 25 Sept 2014, V. Saini, mc 2258, ♂ genitalia slide MC 1235, ♀ genitalia slide MC 1236. 1♂, 1♀, Paddy Breeding Station, TNAU-Coimbatore, 11°0' N, 77°0' E, AMSL- 426.72 m, 16 Nov 2015, V. Saini, mc 2514, ♂ genitalia slide MC 1345, ♀ genitalia slide MC 1346. Deposited in Insect Biosystematics Laboratory, TNAU, Coimbatore.

Comments

This is the largest leaf folder species found on rice crop in Tamil Nadu.

Distribution

West Indies, Africa, Sri Lanka, South India, Fiji, Celebes, Marquesas Islands, Society Islands, Tuamotus, Austral Islands (Rapa), Java and Ellice Islands.

5. *Cnaphalocrocis exigua* (Butler)

[Fig-12-13, 23-24, 31]

Samea exigua [5] Type locality: Japan.

Bradiomorpha nawae Matsumura.

Susamia exigua (Butler) [11].

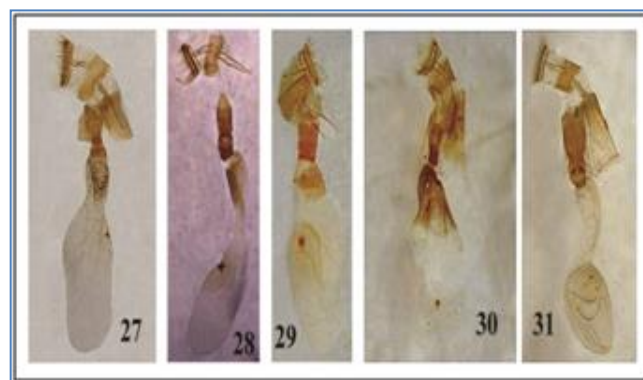
Marasmia exigua (Butler) [12].

Cnaphalocrocis exigua (Butler) [18].

Description

[Fig-12, 13]

Small to medium sized moth. Wings span 13mm in female and 14-15mm in male. In female, forewing with dark greyish brown C-shaped band on forewing which covers the subterminal and terminal area. Costal margin of forewing with minute 9-10 black strigulae which is absent in male. Male wings and body ochreous yellow. Both forewing and hind wing with broad marginal band; antemedian and postmedian transverse lines present; antemedian line shallowly outward curved below costa, postmedian line arising from end of costal infuscation; inner edge of marginal line curving towards postmedian line costally. Hindwing with two parallel lines transversing the wing; antemedian median and postmedian lines are prominent; basal and costal areas heavily greyish brown. Abdomen greyish brown. On eighth abdominal segment, two white laterally situated band with black line medially and mass of ochreous brown hairs on the abdominal tip in female. Male with black spot on seventh abdominal dorsum.



Figs. 27-31. (Scale bar- 0.2mm). Female genitalia of *Cnaphalocrocis* spp. 27. *Cnaphalocrocis medinalis*; 28. *C. patnalis*; 29. *C. ruralis*; 30. *C. trapezalis*; 31. *C. exigua*.

Male genitalia

[Fig-23-24]

Uncus short, two oval processes covered with transverse row of short sclerotized spines. Tegumen short and fringed with long hairs. Valvae flap-like, broad and slightly setose in inner surface, medially situated spine on outer margin of valva. Saccus V-shaped and slightly pointed basally. Sacculus membranous and narrowly rolled inward. Aedeagus moderately cylindrical and two robust sickle-like cornuti; apical one twice as long as the basal.

Female genitalia

[Fig-31]

Anal papillae weakly sclerotized and surface covered with long hairs, apex rounded. Apophyses weak, posterior pair approximately half of length of anterior apophyses. Ostium bursae moderately wide and sclerotized. Bursa copulatrix broadly truncate basally and surrounded with composite-like granulations along the signum. Ductus bursae long and slightly curved outside, slender, lightly sclerotized and spiculated with neck at midpoint.

Material examined: 2♂, ARS, Thirupathisaram, Tamil Nadu, 8.17°N, 77.43°E, AMSL- 40 m, 24 Oct 2014, V. Saini, mc 2562, ♂ genitalia slide MC 1384, MC 1385. 2♂, AC & RI, Trichy, Tamil Nadu, 10°15' to 11°2'N, 78°10' to 79°5'E, AMSL- 90 m, 09 Jan 2015, V. Saini, mc 2625, ♂ genitalia slide MC 1458, MC 1459. 1♂, 1♀, Paddy Breeding Station, TNAU-Coimbatore, 11°0' N, 77°0' E, AMSL- 426.72 m, 28 Nov 2014, V. Saini, mc 2664, ♂ genitalia slide MC 1558, ♀ genitalia slide MC 1559. Deposited in Insect Biosystematics Laboratory, TNAU, Coimbatore.

Comments

This is one of the leaf folder species found in rice ecosystem of Tamil Nadu.

Distribution

Japan, China, Guam, Borneo, New Britain, New Guinea, India, The Philippines, Malaysia, Indonesia, Solomon's Island, Thailand, Oceania and Australia.

6. *Cnaphalocrocis poeyalis* (Boisduval)

[Fig-14, 25-26]

Botys poeyalis [3]

Asopia venialis [33]

Botys marisalis [33]

Botys minutalis [19]

Botys ruralis [33]

Lasiacme mimica Warren

Marasmia cicatricosa [16]

Marasmia hamponi [28]

Marasmia rectistrigosa [30]

Description

[Fig-14]

Small to medium sized moth. Wing span 15–17 mm in male and body length approximately 8 mm. Costal margins of forewing with 8–10 minute black strigulae. Males of *C. poeyalis* similar in forewing markings to males of *C. ruralis* differ in their size only; forewing with prominent androconial hairs as compared to *C. ruralis*; apex region of fore wing and hind wing densely covered with scales; forewing with broad antemedian, postmedian transverse line and marginal band; antemedian line outwardly curved below costa, the postmedian line arising from end of costal vein and inner edge of marginal line curving towards postmedian line costally. In male, seventh segment marked with brownish bunches of hairs and white bands laterally.

Male genitalia

[Fig-25-26]

Uncus short, tubular, membranous and two oval processes covered with transverse rows of short spines. Tegumen fringed with long hairs. Valvae petal-like and divided as two lobes at the corona; lobes rounded, one broader than other, spur like projection present at the upper margin of sacculus. Saccus broadly V-shaped. Coremata present. Aedeagus slender, tubular and cornuti at the tip of the vesica and form a spike shaped structure.

Material examined: 2♂, AC & RI, Trichy, Tamil Nadu, 10°15' to 11°2'N, 78°10' to 79°5'E, AMSL- 90 m, 27 Jan 2015, V. Saini, mc 2699, ♂ genitalia slide MC 1625, MC 1626. 2♂, Paddy Breeding Station, TNAU-Coimbatore, 11°0'N, 77°0'E, AMSL- 426.72 m, 16 Nov 2014, V. Saini, mc 2758, ♂ genitalia slide MC 1684. Deposited in Insect Biosystematics Laboratory, TNAU, Coimbatore.

Distribution

India, Sri Lanka, Myanmar, Thailand, China, Japan, Indonesia, Australia, Africa, Mauritius and La Reunion.

Conclusion

Based on the studies conducted, there are six leaf folder species were found in rice ecosystem in Tamil Nadu and basic morphological & genitalia characters were similar. Among the all leaf folder species, three species namely, *Cnaphalocrocis medinalis*, *C. patnalis* and *C. ruralis* were dominant. Other leaf folder species occurrences were very less. Still, there is a conflict of identification present among rice researchers and more studies needed to distinguish between the species.

Abbreviations

AMSL- Above Mean Sea Level; ANT.APO- Anterior Apophyses; COR- Coremata; CRN- Cornuti; CRP.BU- Corpus Bursae; DU.BU- Ductus Bursae; mc- mixed collection; MC- Main collection; PAP.A- Papillae Anales; PO.APO- Posterior

Apophyses; SAC- Saccus; SIG- Signum; SL- Sacculus; SPI- Spine; UN- Uncus; VAL- Valva; VES- Vesica.

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