NOTES ON NATURAL HISTORY

Redescription of *Cadrema pallida* var. *bilineata* (de Meijere, 1904) (Diptera: Chloropidae) and its role as pollinator and carrion feeder from Indian Sunderbans

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Study Area: Bali Island, Sagar Island and Bakkhali Island,
Sunderban Biosphere Reserve, India.

Coordinates: 22°05.335' N & 088°45.552' E; 21°38.265' N &
088°04.946' E; 21°35.089' N & 088°17.323' E

Key words: Diptera, Flower visitor, Sunderban Biosphere
reserve.

Introduction:

Sunderbans, the UNESCO World Heritage Site is one of the largest mangrove forests in the World. This unique tidal halophytic mangrove ecosystem is also spread over the neighbouring country- Bangladesh. This ecosystem supports a variety of halophytic mangrove species and provides shelter and food to many faunal components (Chakraborty, 2011). Till date, several studies have been made on dipteran fauna from SBR which was altogether compiled by Mitra (2013). Further, Mitra *et al.* (2014, 2015) added some more records of the Diptera from this area. Apart from documenting the dipteran insects, we attempted here their functional contribution towards sustainability of this sensitive ecosystem.

Unfortunately, no record of any representative of the family Chloropidae from SBR has been reported yet. The present communication reports *Cadrema pallida* var. *bilineata* (de Meijere, 1904) belonging to this family for the first time from SBR, India. An attempt has also been taken to highlight the role of the species as a pollinator of mangroves.

Taxonomic Account:

The family Chloropidae is a group of acalyptrate Diptera under suborder Brachycera (Pape *et al.*, 2011), commonly known as grass flies. These are usually very small flies (1.0-4.0 mm), rarely medium-sized (6.0-9.0 mm), yellow or black and appearing shiny. The wings after being developed, sometime get reduced to small disks (plates) having scanty venation (Cherian, 2002).

Systematic Account:

Order Diptera; Suborder Brachycera; Clade Cyclorrhapha;
Infraorder Schizophora; Parvorder Acalyptratae;
Superfamily Carnoidea; Family Chloropidae

Cadrema pallida var. *bilineata* (de Meijere)

1904. *Cadrema pallida* var. *bilineata* de Meijere. *Dierk.* 17: 113
(sex?; Hippelates).

1989. *Cadrema pallida* var. *bilineata*: Mathis. Atoll Research
Bulletin. 327: 7

Type- Locality: Pasuruan, Java.

Material examined: 2exs. Bali Island, 9 no. Gheri, Sunderban, West Bengal, India, 20.iii.2015; 3exs. Sagar Island, Gangasagar, Sunderban, West Bengal, India, 19.v.2015; 1exs. Bakkhali, Kalisthan, Sunderban, West Bengal, India, 18.vi.2015; coll. B. Mitra & party.

Re-description: Body brownish yellow, very small in size (1.6-2.0 mm) (Fig.- 1a), head orange-yellow in colour except vertical triangle, eyes black, antennae yellow with dark brown arista bearing two rows of small concolorous hairs, proboscis and palpi are also yellow in colour.

Pronotum bears a pair of black round spots in the middle portion. Notopleural region brownish.

Thorax orange-yellow in colour with a pair of light brown longitudinal stripes, closest to lateral margins of the thorax (Fig.- 1b), basal half of the scutellum concolorous with a pair of convergent bristles. Post scutellum dark brown or black; wings hyaline, margin of the wings are covered with small bristles.

Abdomen brown in colour, anterior part is lighter while the posterior part of the abdomen becomes darker brown.

Legs yellowish brown with profuse yellow hairs, fore tibiae and tarsi only dark brown, mid leg uniformly yellow, hind femora robust and light yellowish in colour while the tibiae of the hind leg little darker with a stout curved black bristle at apex (Fig.- 1c).

Distribution: Widespread in the Orient and Oceania (extending to the Marquesas and south to the Pitcairn Group).

Potential as Flower visitor/ Pollinator:

Cadrema pallida var. *bilineata* was noted in large numbers visiting the flowers of *Excoecaria agallocha* at Bakkhali and flowers of *Avicennia officinalis* at Bali and Sagar Islands. The frequency of visit, behavioural activities and duration spent on a single flower confirm this species as a potential pollinator of these mangrove species.

Potential as an agent for forensic entomology:

Cadrema pallida var. *bilineata* is also observed in large numbers along with several other dipteran species,

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viz. *Chrysomya megacephala* (Fabricius, 1794) of the family Calliphoridae, *Musca (Musca) domestica* Linnaeus, 1758 and *Atherigona (Acritochaeta) orientalis* Schiner, 1868 of the family Muscidae and *Sarcophaga (Liosarcophaga) dux* Thomson, 1869 of the family Sarcophagidae on the carcass of a dog found lying on the shorelines of the river Gomor (local name), a tributary of River Ganges. The first sighting of *C. pallida* var. *bilineata* occurred after 48 hours of the death of the host and the number of species increased within 72 hours after the death of the animal. *Chrysomya megacephala* (Fabricius, 1794) is observed almost in similar numbers at 48 and 72 hours of a time interval (table - 1).

Table 1: Dipteran species present in different time interval from dog carcass (h=hours)

S.n.	Name of the species	Family	24h	48h	72h
01	<i>Cadrema pallida</i> var. <i>bilineata</i>	Chloropidae	X	✓	✓
02	<i>Chrysomya megacephala</i>	Calliphoridae	X	✓	✓
03	<i>Musca (Musca) domestica</i>	Muscidae	✓	✓	X
04	<i>Atherigona (Acritochaeta) orientalis</i>	Muscidae	X	✓	X
05	<i>Sarcophaga (Liosarcophaga) dux</i>	Sarcophagidae	X	✓	✓

(X- absent; ✓ -Present)

Discussion:

This is the first report on the occurrence of the species *C. pallida* var. *bilineata* (de Meijere, 1904) and the first representative of the family Chloropidae from SBR. According to Sabrosky (1977), only two species of the genus *Cadrema* Walker were reported from India; *C. minor* (de Meijere, 1908) was reported from Assam, Maharashtra, West Bengal and *C. pallida* var. *bilineata* was reported from West Bengal. This species, *C. pallida* var. *bilineata*, is known from Afro-tropical, Palearctic, Nearctic and Oriental region and is a very widely distributed species. Citation of this species was also found from several islands of the Indian Ocean and South Pacific Ocean.

Earlier Hinckley (1969) only reported the genus *Cadrema* (species name not mentioned) as flower visitor of *Morinda* shrubs at Tokelau atolls, territory of New Zealand in the South Pacific Ocean. This communication reports the species *C. pallida* var. *bilineata* as flower visitor/pollinator of the major mangrove species *Excoecaria agallocha* and *Avicennia officinalis* in Sunderbans. This species is moderately common on the beach at the high tide mark where debris had accumulated (Mathis, 1989), which also supports the present observation as an enormous number of examples are found in mangrove zones of Bali Island, Bakkhali and also near the sea beach areas of Sagar Island.

Previously, Bohart & Gressitt (1951) in Guam recorded *C. pallida* var. *bilineata* on human excrement, cow and pig dung, dead rat, decaying molluscs, star fishes and coconut, tomato, papaya. Moreover, this species could be

Figure-1: photographed under the Leica M205.

highly attracted to the decaying flesh of rats, fishes, molluscs etc. Bohart & Gressitt (1951) have also found larvae of this species from decaying mollusc's body, rotten coconut, and pig excrement. This is the first report of this species from the carcass of a mammal from India. Therefore, this species can be considered as an important agent in forensic entomology.

Conclusively, *Cadrema pallida* var. *bilineata* has been re-described from West Bengal, India after a long time. Earlier, nothing has been mentioned about its natural history.

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