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Unique record of chloropid pest in rice (*Oryza sativa*)*

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Chloropids are small flies, often called grass flies. Characteristically, they have large triangular plate on the frons, with base at the vertex and extending antero-ventrally toward the antennal bases. This frontal triangle is commonly bare and polished, although dull and microtonetose (pollinose) in some genera. They commonly have a distinct flexure in the long penultimate section of vein CuA, which occurs opposite or before the middle of cell bm + dm. Chloropid larvae are saprophagus, phytophagus (such as frit fly, wheat stem maggots and gout fly of barley), gall formers, egg-predators (in/on egg masses of spiders, mantids, grasshoppers, and few lepidopterans), few are parasites. Controversial reports exist on parasitic status, phytophagus status (Sherwill *et al*. 1999 and Upadhayay *et al*. 2001) of this chloropid pest.

Field surveys were carried out in 4 districts of Uttar Pradesh (Ghaziabad, Bulandshahr, Aligarh and Mathura) under agro-ecological zone no.5; and the farmer respondents (N=12) were inquired about the previous crop-history, rice variety, severity of pest, pesticides used by them for combating the grass fly problem. Grass fly infested paddy hills were brought to Plant Health Clinic, Division of Entomology, IARI, New Delhi; by farmers of Ghaziabad on 14 July 2008 and farmers of Aligarh and Mathura districts on 25 September 2008. Farmers' fields were visited in Bulandshahar district of Uttar Pradesh on third September 2008 to collect the infested paddy-hills. These samples were kept in plastic jars along with soil brought from the same fields and regular watering was done to keep them alive. These plastic jars were wrapped with white cotton cloth to notice grass fly easily. Emerged grass flies were counted until emergence stopped.

The rice stem borers, which infest the rice plant from seedling to maturity, are worldwide in distribution and are considered as most important of all (Sudhir *et al*. 2004). Hitherto, reporting chloropid pest resembles with stem borers in damage symptoms. It is possible that in past, grass fly damage symptoms might have been mistaken as that for stem borers.

The crop suffered from dead heart damage by this dipteran pest. Typical dead heart symptoms observed in grass fly infested rice hills (Fig 1) can easily misguide anyone for its similar damage by rice stem borers, unless one dissects out the affected tillers and search for the causal agents. Tiny flies' maggots were observed in the tillers.

'Pusa 1121' is a common and most popular rice variety covering majority of the area in this locality (Singh 2009). If this variety is susceptible, then there is every possibility of further spread of this pest problem, which warrants serious thinking and appropriate actions in time. This deliberation aims at making awareness amongst all the rice workers so as to be able at their level, diagnosis of this pestilence by matching these description and photoplates.

The taxonomy of Chloropidae is still in a state of confusion, especially as regards to generic boundaries. Some species of Chloropidae are plant feeders including some



Fig 1–3 1. Deadhearts in rice hill caused by grass fly, 2. Coastal break (1) and absence of anal cells (2), 3. Ocellar triangle between two compound eyes

*Short Note

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Table 1 Morphometrics of grass fly (*Anatrichus* sp.)

Sex	Head		Thorax		Abdomen		Body		Wing		Antennae
	Length	Breadth	Length	Breadth	Length	Breadth	Length	Breadth	Length	Breadth	Length
Female	0.51± 0.02	0.80± 0.03	0.94± 0.02	0.96± 0.03	1.51± 0.03	1.10± 0.03	2.97± 0.03	0.96± 0.03	2.46± 0.03	0.85± 0.04	0.52± 0.02
Male	0.39± 0.03	0.68± 0.03	0.88± 0.04	0.82± 0.02	1.13± 0.03	0.71± 0.04	2.42± 0.04	0.82± 0.02	2.20± 0.03	0.77± 0.03	0.50± 0.02

Figures in mm (mean ± Sd)

Table 2 Grass fly infestation survey (July–Sept 2008) as per the local farmer respondents in Uttar Pradesh (4 districts of agro-ecological zone no. 5: Basmati rice belt)

Farmer respondents with their crop-area (in acres)		Locality	Variety	Adjacent crops	Previous crop	Pesticides used	Incidence (Y/N)	Incidence (%)
1	4	Ghaziabad	Pusa 1121	Sugarcane	Wheat, Sugarcane	Monocrotophos, endosulfan	Y	30
2	2	Bulandshahr	Pusa 1121	Paddy, Sugarcane	Maize, Sugarcane	Methyl parathion, endosulfan, cartap hydrochloride	Y	25
3	3	Bulandshahr	PB 1	Paddy, Sugarcane	Wheat	Methyl parathion, endosulfan, cartap hydrochloride	Y	25
4	3	Bulandshahr	PB 1	Paddy, Sugarcane		Endosulfan, cartap hydrochloride	Y	20
5	10	Bulandshahr	PRH 10	Paddy, Sugarcane		Phorate, endosulfan, cartap hydrochloride	N	0
6	5	Bulandshahr	Pusa 1121	Paddy, Sugarcane		-do-	N	0
7	3	Bulandshahr	Pusa 1121	Paddy, Sugarcane		-do-	N	0
8	4	Bulandshahr	PB 1	Paddy, Sugarcane		-do-	N	0
9	15	Bulandshahr	PRH 10	Paddy, Sugarcane		-do-	N	0
10	6	Bulandshahr	PB 1	Paddy, Sugarcane		-do-	N	0
11	15	Aligarh	PB 1	Paddy		Endosulfan, nuvan, cypermethrin, chlorpyriphos, cartap, carbofuran	Y	10
12	20	Mathura	PB 1	Paddy		Monocrotophos, endosulfan, dimethoate	N	0

'Pusa 1121' is the evolved rice basamati, most popular in Uttar Pradesh (about 40% of basmati area is under this variety)
'PB 1' is 'Pusa Basamati 1'

important agricultural pests and in the larval stages attack Poaceae, cereal crops and pasture grasses. Some species are secondary invaders of shoots already attacked by *Atherigona* (Muscidae) larvae and those of lepidopterous stem-borers (Dawah and Abdullah 2006).

Morphometrics of grass fly (*Anatrichus erinaceus*; Order-Diptera, Suborder-Brachycera) is presented in Table 1. *Anatrichus* is having 7 species (Life Catalogue 2007, http://zipzodezoo.com/key/Animalia/*Anatrichus*).The taxonomic characters were checked, matched with characters and photo-images available on internet (http://dipteran.info/photogallery), also got confirmed through personal communication (Nikita Vikhrev of Moscow, Russia). The characteristic wing venation–broken costa only near Sc or R1, absence of anal cell, and the large ocellar triangle are clearly depicted (Plates 2, 3). Adults are minute with dimensions (length × breadth) of 2.97 mm × 0.96 mm (female) and 2.42 mm × 0.82 mm (male). Black coloured adults thorax is full of vertically directed whitish yellow hairs with black tip. Hind tibia of both the sexes has black dot marking. The abdomen in both sex is unsegmented, which has sclerotized black tergum and the sternum is membranous, and creamy in colour. Halters are creamy with no hairs. Puparium is chocolate red in colour, 2.6–3 mm in length, and 0.6–0.8 mm in breadth (Fig 4).

The grass fly *A. erinaceus* Loew was documented as a

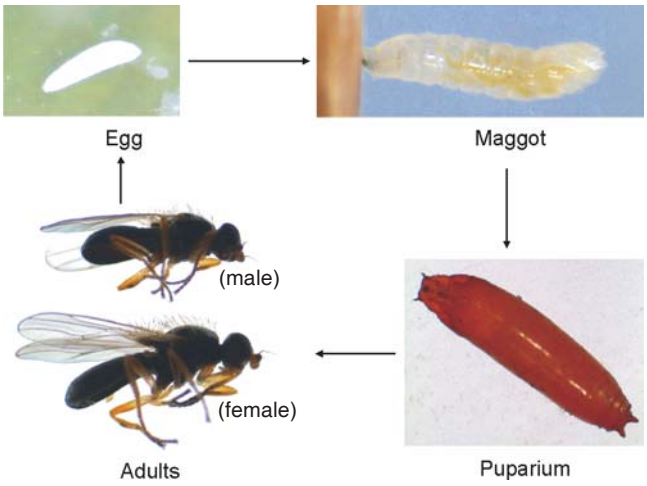

Fig 4 Life stages of grass fly (*Anatrichus* sp.) investigated on rice as host in laboratory

parasitic insect on borers in sugarcane. The ambiguity apropos the discussion already made in introduction part is worth notable. Systematic long-term research is needed in this direction. We dealt only addressing the pest problem as a potential threat. Investigations on biology, bionomics, and management aspects are just initiated. The result of field survey based on farmer respondents was tabulated (Table 2). Though most of the farmers are progressive, and followed pesticide applications, these applications were done after the critical damage period only, that could not save their crop. Maximum damage (30%) was confronted by farmers from Ghaziabad district. Like gall midge pest, this chloropid pest–grass fly needs timely application for crop protection effectively. Most of the farmers had taken 'Pusa 1121' or 'PB 1'; those are the most popular basmati rice varieties (Singh 2009). It seems the varieties are susceptible to this dipteran pest, which needs urgent attention. Samples of grass fly infested rice hills were drawn from 4 districts, brought to laboratory, and results of this caged-investigation till emergence of insect-pests is presented in Table 3.

We could fetter out only one management advice of carbofuran application. Being an internal feeder, systemic insecticides are advised. Taking clue from trial conducted in Israel to control shoot fly *A. erinaceus,* carbofuran granules @ 0.75 kg ai/ha is advocated at the time of planting (www.masa.co.za/labels/carbofuran). Small-scale spraying with monocrotophos @ 0.05% in the early stage (vegetative) may be resorted to. However, this is not to be used unilaterally and in the second half of the crop-stage. As *A. erinaceus* is reported from sugarcane belt, any future occurrence of such situations must be looked into seriously and be reported promptly to experts/taxonomists in time.

Table 3 Incidence of grass fly in laboratory trials (samples drawn from 4 districts of Uttar Pradesh, *kharif* 2008)

Sample	No. of hill	No. of tillers	No. of flies emerged	No. of flies/hill
Ghaziabad	2	23	37	18.5
Bulandshahr	4	68	37	9.25
Aligarh	1	28	3	3
Mathura	1	18	0	0

SUMMARY

A new insect-pest attacking rice is documented from 4 districts (Ghaziabad, Bulandshahr, Aligarh and Mathura) of Uttarpradesh in July-September 2008. This is a dipteran fly, *Anatrichus erinaceus* Loew – under Chloropidae family, and the first report of its kind from Indian sub-continent. Dispute on this grass fly's pest/parasitic status is highlighted herein. The damage symptoms, morphometrics and taxonomic characters are described. A field survey based on 12 farmer respondents was carried out in these localities. Possible *ad hoc* recommendation for management is outlined. This needs further concerted research on biology, bionomics and management aspects. Careful monitoring and timely reporting this chloropid pest is necessary to avoid any upcoming outbreak, particularly in the most popular rice basmati variety 'Pusa 1121' in the northern belt.

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