Content list available at http://epubs.icar.org.in, www.kiran.nic.in; ISSN: 0970-6429

Indian Journal of Hill Farming

June 2020, Volume 33 Issue 1, Page 25 -31

Varietal screening of rice accession and evaluation of newer molecules on the incidence of rice gall midge (*Orseolia oryzae* wood-mason) in Manipur

M. Das[1] . K.I. Singh[2] . I.Y. Longkumer[3]*

[1-2]Central Agricultural University, West Imphal, Manipur;
[3]Dr. Rajendra Prasad Central Agricultural University, Pusa, Bihar

ARTICLE

Article history:
Received 12 October 2018
Revision Received 5 May 2019
Accepted 20 July 2019

Key words: Orseolia oryzae, CAU-R4, CAU-R3, Flubendiamide, Fipronil

----

ABSTRACT

Two sets of field trials were experimented during *Kharif*, 2014 at the research farm of College of Agriculture, Central Agricultural University, Imphal to investigate the susceptibility of promising local rice varieties and new molecules on the incidence of Rice Gall Midge (*Orseolia oryzae* Wood-Mason). The results on the resistant reaction of fifteen rice varieties against the pest revealed that though none of screened varieties exhibited high degree of resistance, all the varieties significantly reacted against the test insect pests. However, lowest incidence of *Orseolia oryzae* was noticed in the var. CAU-R4, CAU-R3, RCM-9 and CAU-R1 with per cent incidence of 5.13, 5.61, 5.89 and 6.01 respectively. Among the various new molecular insecticides field evaluated against the pest, treated plots harboring the lowest silver shoot of 5.82 per cent was recorded in plots treated with Flubendiamide 39.35 SC@ 50 g a.i. ha^{-1} followed by Fipronil 5 SC@ 100 ml a.i. ha^{-1}(5.89% SS).

1. Introduction

Rice *Oryza sativa* L is an important crop worldwide, which serves as the staple food for more than half of the total world population and also additionally contributes in industry and for animal feed. It is grown in diverse geographical Zones in the tropical and subtropical areas, especially in Asia, accounting for 90% of the world production (IRRI, 2015). Area wise, India accounts for around 43.95 million ha under rice cultivation, 103.61 million tonnes of production and productivity of 2462 kg/h (Anon. 2015). Rice is mainly grown during the *Kharif* season in Manipur cultivating in an area of 2, 44,000 hectares, producing 645 thousand tonnes with a productivity of 2413.52 ha^{-1} (Anon. 2016). Apart from the abiotic factors contributing to the reduction of seasonal yield, biotic factors seemingly creates a constant havoc. This may include weed population, plant diseases, insect pest etc. Among the insect pests, currently rice gall midge (RGM) is considered as major pest in India and ranked second, based on its relative importance. In India gall midge has been reported from almost all the rice growing states including the coastal and northern Telangana regions of Andhra Pradesh, Jharkhand, Chhattisgarh, Madhya Pradesh, Kuttand region of Kerala, Iroisemba and Wangbal areas of Manipur, Madurai region of Tamil Nadu and the Coastal region of Karnataka which are considered as "Hot spots" (Anon., 2002). Maggots of *Orseolia oryzae* (Wood- Mason) feeds on the apical meristem and induces the formation of a gall. It further prevents differentiation of the tillers and the formation of reproductive structures leading to crop yield losses. The loss in yield in a heavily infested crop may be up to 50 % (Paul, 2007). RGM is a crepuscular, minute pests, and their larvae stay well protected within the gall.

*Corresponding author: dawson567890@gmail.com

As a result, pest management using pesticides or predators is arduous and often inefficient (Jahn and Bunnarith 2004). Pest management practices involving various components can play a crucial role to counteract the menace of the pest. Utilization of resistant cultivars can create a huge barrier to the attack of the pest population and in addition to increasing yield; resistance may also lead to reduced use of dangerous insecticides. Host plant resistance is likely to be more durable if it employs an array of resistance genes encoding diverse mechanisms of defence. This durability of resistance depends on the population dynamics of the insect whilst resistance is more likely to break down if the pest population is genetically diverse or if rates of mutation or migration are high. In a report, Over 70 gall midge-resistant rice varieties have been developed and released for commercial cultivation since 1975 (Rani et al., 2011) and so far, 11 gall midge resistance genes have been characterized in rice (Himabindu et al. 2010), and seven biotypes of the pest have been reported (Vijayalakshmi et al. 2006). Interestingly, none of the identified genes confers resistance to all the gall midge biotypes, while none of the gall midge biotypes is virulent against all the resistance genes. Keeping the view above, two sets of trial were carried out to assess the resistant reaction of some cultivars and efficacy of newer molecules against *Orseolia oryzae* in the rice cropping area of Manipur.

2. Materials and Methods

Two sets of field experiments were carried-out during *Kharif* season of 2014 in the Rice research farm of the College of Agriculture, Central Agricultural University (Imphal) to investigate the effect of certain rice varieties and new molecules on the incidence of the gall midge (*Orseolia oryzae* Wood-Mason). The Rice Research Farm, is situated at 24 045' N latitude and 93 0 56' E longitude with at an elevation of 790 m above the mean sea level. The soil type was clay loam in texture and acidic in reaction having p^H value of 5.5. The seedlings were raised in the properly prepared nursery beds for all the experiments Before sowing, the seeds were soaked for two days and kept in shade after treating with Anokhi (Carbendazim 12% + Mancozeb 63%) 75 WP @ 2 g per kg of seeds in order to make the seeds disinfected from fungal diseases. The seeds for insecticides evaluations trials also treated with insecticides Gaucho(Imidacloprid 600 FS) @ 7 ml per kg of seeds then the treated seeds were allowed to sprout by keeping in a gunny bag for 24 hours. The sprouted seeds were sown on the prepared seed beds and the seedlings were uprooted when they attained 4-5 leaf stage (30 days old). One month prior to transplanting, the well decomposed FYM @ 10 tonnes per hectare was thoroughly incorporated into the soil. The thirty days old seedlings were transplanted with inter and intra-row spacing of 15 x 10 cm at the rate of three seedlings per hill, timely irrigation was given to the experimental fields by maintaining water level of 5 cm in the field upto dough stage of the crop. The crop field was kept weed free through hand weeding at 20 days after transplanting (DAT) and 55 DAT.

Screening of certain rice varieties on the incidence of O. oryzae

For the field study, the experiment was laid-out in Randomized Block Design (RBD) with three replications. Fifteen Rice varieties including one check were field-tested for their resistance reaction against the pests. One-month-old seedlings of each variety were transplanted in the plot size of 3 x 2 m2 at 15 x 10 cm spacing. No pest control measures were followed in the experimental crop.

Details of the variety

V_1 =	WR-15-6-1
V_2 =	WR-1-9-1-1
V_3 =	CAU-R2
V_4 =	Lamyanbaphou
V_5 =	WR-3-2-6-1
V_6 =	CAU-R3
V_7 =	KD-5-3-14
V_8 =	CAU-R1
V_9 =	RC-MANI-PHOU-11
V_{10} =	Matamphou
V_{11} =	CAU-R4
V_{12} =	RCM-9
V_{13} =	KD-6-18-7-1
V_{14} =	RC-MANIPHOU-6-RC-5
V_{15} =	Leimaphou (KD-2-6-3)

Observation recorded:

Observation on Gall midge infestation was recorded after 30, 50 and 65 DAT (Days after transplanting) from 10 randomly selected hills per plot. The percentage infestation will be determined by using the following formula:

$$\text{Infestation}\,(\%) = \frac{\text{Number of silver shoots per hill}}{\text{Total number of tillers per hill}}\ \text{X}\ 100$$

The adjusted damage rating (D) of entry will be converted to a scale given by Heinrichs *et al.* (1985).

Scale	Plants with galls	Grade
0	None	No damage
1	Less than 1	Resistant
3	1-5	Moderately resistant
5	6-15	Moderately susceptible
7	16-50	Susceptible
9	51-100	Highly susceptible

Evaluation of new molecular insecticides against *O. oryzae*

Design and lay-out of the experiment

A separate field experiment was laid-out in Randomized Block Design (RBD) replicating thrice with a plot size of 3 x 2 m^2 and spacing of 15 x 10 cm. The high yielding susceptible variety 'Leimaphou (KD-2-6-3)' was used for the experiment. Seven new molecules and one synthetic organic insecticide were tested. There was an untreated control in each replication.

Details of treatment:

Treatment	Insecticides	Dose a.i./ha
T_1	Rynaxypyr 18.5 SC	150 ml
T_2	Dinotefuran 20 SG	200 g
T_3	Flubendiamide 39.35 SC	50 g
T_4	Thiamethoxam 25 WG	25 g
T_5	Thiacloprid 21.7 SC	50 g
T_6	Imidacloprid 17.8SL	250 ml
T_7	Imidacloprid 20 SL	100 ml
T_8	Imidacloprid 70 WG	30 g
T_9	Fipronil 5 SC	100 ml
T_{10}	Acephate 75 SP	500 g
T_0	Untreated / control	Water spray

Application of insecticides:

Two rounds of foliar application of the test insecticides were made first at 30 DAT (days after transplanting) and second at 50 DAT with a high volume hand compression knapsack sprayer at a spray volume of 500 liters per hectare. Observation on silver shoot was made at 5 days and 10 days after each insecticide application from 10 randomly selected hills/plot in each plot. The total number of tillers as well as infested tillers was counted in all the 10 hills under observation. The percentage of the infestation was determined by using the following formula:

$$\text{Infestation}\ (\%) = \frac{\text{Number of silver shoots per hill}}{\text{Total number of tillers per hill}}\ \text{X}\ 100$$

3. Result and Discussion

Incidence of O. oryzae against rice varieties

The pooled mean data of three observation intervals presented in Table 1 revealed that there was variation in different rice varieties screened for their reaction to the gall midge during the period of investigation. Of the fifteen varieties tested during *Kharif*, 2014, CAU-R4 recorded the lowest per cent silver shoot of 5.13 and was followed by CAU-R3 (5.61% SS), RCM-9 (5.89% SS) and CAU-R1 (6.01% SS) which did not show significant difference from one another. While the variety Lamyanbaphou recorded the highest incidences (7.43 %) of silver shoot as against 13.04% in the check variety Leimaphou (KD-2-6-3), but had non-significant difference from the rest varieties. The mean silver shoot per cent in rest of the varieties varied from 6.01 - 7.29 which minimum being in variety 'CAU-R1' and maximum in WR-3-2-6-1 variety. The variety RC-MANI-PHOU-11 (6.23 % SS) was at par with Matamphou (6.35 % SS). The rating made based D-values determined for all the screened varieties revealed that nine varieties WR-1-9-1-1, CAU-R3, KD-5-3-14, CAU-R1, RC-MANI-PHOU-11, Matamphou, CAU-R4, RCM-9, and RC-MANIPHOU-6-RC-5 were categorized as susceptible, whereas the rest six varieties *viz.,* WR-15-6-1, CAU-R2, Lamyanbaphou, WR-3-2-6-1, KD-6-18-7-1 and Leimaphou (KD-2-6-3) were rated as highly susceptible to *O. oryzae* infestation. The present finding is in conformity with the record of Singh, 2010 who reported that among the test varieties the mean silver shoot per cent varied from 15.102 to 16.31 minimum being in variety 'RCM-9'.

Field efficacy of new molecules against *O. oryzae* on Rice var. "Leimaphou (KD-2-6-3)"

Effect of insecticides on the incidence of O. oryzae during first spray

The gall midge damage on leaf counts made 1 day before spraying revealed that the silver shoot per cent varied from 10.65 -11.91 in different plots without any significant difference between them (Table. 2). At 5 DAA, per cent of SS significantly varied from 7.23 to 16.87 per cent SS in various plots treated with insecticides as against 17.27 per cent silver shoot in untreated control plot. However, minimum silver shoot incidence (7.23% SS) was observed in the treatment with Flubendiamide 39.35 SC, followed by Thiacloprid 21.7 SC (8.32% SS) and Fipronil 5 SC (10.23% SS) treated plots which showed non-significant difference one another. The maximum incidence of silver shoot (16.87% SS) was exhibited by the plots treated with Acephate 75 SP.

The mean percentage silver shoot recorded in the plots treated with the rest of insecticides was varied from 11.17 to 16.07 per cent (Table 2). At 10 DAA, the minimum per cent silver shoot (6.42% SS) was recorded in Fipronil 5 SC treated plots as against 18.18% in untreated control plots. While, per cent silver shoots recorded in the treatments with Dinotefuran 20 SG (6.75% SS), Flubendiamide 39.35 SC (6.85% SS), and Imidacloprid 20 SL (7.98%) were not differ significantly from one other. The treatment with Thiamethoxam 25 WG resulted least effectiveness against the gall fly recoding maximum mean per cent silver shoot of 14.52.

Effect of insecticides on the incidence of O. oryzae during 2nd spray

At 5 DAA during second spray, the minimum percentage silver shoot (4.42 % SS) was recorded in Fipronil 5 SC treated plots as against 14.27 per cent in untreated control plots. While minimum per cent silver shoots recorded in the treatments with Flubendiamide (5.43% SS), Dinotefuran 20 SG (5.77%) and Imidacloprid 17.8 SL (6.23% SS) were not differ significantly from one another. The treatment with Thiamethoxam 25 WG resulted least effectiveness against the gall fly recording maximum mean per cent silver shoot of 9.33 per cent. At 10 DAA during second spray, the minimum percentage silver shoot (2.85% SS) was recorded in Fipronil 5 SC treated plots as against 10.30 percent in untreated control plots. While, the plot treated with Imidacloprid 17.8 SL (3.65% SS) was at par with plots treated with Dinotefuran 20 SG (3.70% SS). However, minimum percent sliver shoot also recorded in plots Flubendiamide 39.35 SC (3.77% SS), Imidacloprid 70 WG (4.43% SS), Imidacloprid 20 SL (4.45% SS) and Thiacloprid 21.7 SC were not differ significantly from one another. The treatment with Acephate 75 SP resulted least effectiveness against the gall fly recording maximum mean per cent silver shoot of 7.85 per cent.

Mean silver shoot incidence over two sprays based on 5 DAA and 10 DAA (remove)

The two sprays pooled silver shoot per cent data presented in Table 2 simply clear that all the insecticidal treatments were superior in controlling the damage caused by *O. oryzae* in comparison to untreated control. Treated plots harbouring the lowest silver shoot of 5.82 per cent was recorded in plots treated with Flubendiamide 39.35 SC@ 50 g a.i. ha^{-1} as against 15.00 per cent in untreated control and closely followed by Fipronil 5 SC@ 100 ml a.i. ha^{-1}(5.89% SS) which didn't differ significantly from Flubendiamide 39.35 SC. The rest of the treatments differ significantly except Imidacloprid 17.8 SL@ 250 ml a.i. ha^{-1}(7.78% SS),Thiacloprid 21.7 SC@ 50 g a.i. ha^{-1}(8.04% SS) and Imidacloprid 20 SL@ 100 ml a.i. ha^{-1}(8.34% SS) which were not differ significantly from each other. The treatment with Thiamethoxam 25 WG@ 25 g a.i. ha^{-1} resulted least effectiveness against the gall fly recording maximum mean per cent silver shoot of 11.53 per cent. The present finding is in collaboration with Seni and Naik, (2017) who reported that Fipronil 5 SC @ 75 g a.i/ha recorded 3.03 and 2.14 per cent silver shoot during 2013 and 2014, respectively and it was significantly superior to other treatments

Mean Grain Yield:

The test insecticides also differed significantly in their yield attribute in the experimental year, which might be due to its efficacy and variation in their reaction to *O. oryzae* infestation. The highest grain yield 5.98 (t/ha) was obtained from the plots treated with Fipronil 5 SC as against 3.95 t/ha in untreated/control plot. It was closely followed by Flubendiamide 39.35 SC, Imidacloprid 17.8 SL, Imidacloprid 20 SL with mean grain yield of 5.85, 5.82 and 5.74 t/ha respectively, which did not differ significantly from one another. The minimum yield was observed in the plot treated with Acephate 75 SP (4.4 t/ha).The mean grain yield of the rest of the varieties varies from 5.60 – 4.70 t/ha and maximum yield observed in Imidacloprid 70 WG and minimum yield observed in Thiamethoxam 25 WG (Table 3). The data on cost effectiveness of various insecticides in controlling the primary insect pests of rice presented in Table 3 revealed that Fipronil 5 SC gave the maximum net profit of Rs 44160.00 with cost benefit ratio of 1:2.64, while Imidacloprid 70 WG treatment recorded the maximum cost benefit ratio of 1:3.56 with higher net profit of 38650.00. The Acephate 75 SP treatment gave minimum net profit of Rs. 5450.00 with the lowest cost benefit ratio (1:0.68).

Table 1. Effect of certain rice varieties on the incidence of *O. oryzae* during *Kharif*, 2014

Variety	Mean percentage of Silver Shoot at			Pooled mean	D- Value	Damage score	Rating
	30 DAT	50 DAT	65 DAT				
V_1	10.00 (3.24)	8.23 (2.95)	3.60 (2.02)	7.28 (2.74)	55.83	9	HS
V_2	6.70 (2.68)	8.20 (2.95)	4.44 (2.20)	6.45 (2.61)	49.46	7	S
V_3	9.30 (3.13)	7.42 (2.81)	4.34 (2.20)	7.02 (2.71)	53.83	9	HS
V_4	10.00 (3.24)	8.34 (2.97)	3.95 (2.11)	7.43 (2.77)	56.98	9	HS
V_5	7.70 (2.86)	9.60 (3.17)	4.58 (2.24)	7.29 (2.76)	55.90	9	HS
V_6	3.30 (1.93)	8.37 (2.95)	5.17 (2.37)	5.61 (2.42)	43.02	7	S
V_7	8.00 (2.90)	6.87 (2.71)	4.06 (2.13)	6.31 (2.58)	48.39	7	S
V_8	7.00 (2.74)	7.57 (2.83)	3.47 (1.99)	6.01 (2.52)	46.09	7	S
V_9	4.70 (2.27)	6.90 (2.70)	7.10 (2.74)	6.23 (2.59)	47.78	7	S
V_{10}	5.20 (2.37)	8.37 (2.96)	5.47 (2.44)	6.35 (2.59)	48.69	7	S
V_{11}	4.00 (2.12)	6.67 (2.67)	4.73 (2.28)	5.13 (2.36)	39.34	7	S
V_{12}	4.70 (2.28)	7.80 (2.85)	5.17 (2.38)	5.89 (2.50)	45.17	7	S
V_{13}	7.00 (2.72)	8.94 (3.05)	4.17 (2.16)	6.70 (2.64)	51.38	9	HS
V_{14}	4.70 (2.28)	9.51 (3.16)	3.95 (2.10)	6.05 (2.51)	46.39	7	S
V_{15}	14.70 (3.90)	17.03 (4.18)	7.38 (2.77)	13.04 (3.26)	100.00	9	HS
CD(P=0.05)	0.36	0.44	0.45	0.97			

Figures in parentheses are $\sqrt{(X+0.5)}$ transformed values

Mean of three replications based on two sprays

Table 2. Effect of different insecticidal treatments on the incidence of *O. oryzae* in Rice variety 'Leimaphou' (KD-2-6-3) during *Kharif*, 2014

Treatments	Dose	Mean percentage of Silver shoot					
		1st spray			2nd spray		Pooled mean
		1DBA	5 DAA	10DAA	5DAA	10DAA	
T_1	150 ml	11.05 (3.40)	12.14 (3.55)	10.29 (3.27)	8.45 (2.98)	5.13 (2.37)	9.00 (3.04)
T_2	200 g	11.72 (3.50)	12.13 (3.50)	6.75 (2.68)	5.77 (2.49)	3.70 (2.03)	7.09 (2.67)
T_3	50 g	10.65 (3.38)	7.23 (2.78)	6.85 (2.69)	5.43 (2.41)	3.77 (2.05)	5.82 (2.48)
T_4	25 g	11.54 (3.47)	16.07 (4.05)	14.52 (3.87)	9.33 (3.11)	6.21 (2.57)	11.53 (3.40)
T_5	50 g	10.77 (3.36)	8.32 (2.92)	11.17 (3.41)	8.03 (2.92)	4.65 (2.27)	8.04 (2.88)
T_6	250 ml	10.75 (3.36)	11.17 (3.40)	10.08 (3.24)	6.23 (2.58)	3.65 (2.03)	7.78 (2.81)
T_7	100 ml	10.85 (3.37)	14.47 (3.81)	7.98 (2.90)	6.37 (2.59)	4.45 (2.20)	8.32 (2.87)
T_8	30 g	11.65 (3.48)	11.53 (3.43)	12.30 (3.56)	7.17 (2.73)	4.43 (2.21)	8.86 (2.98)
T_9	100 ml	10.81 (3.36)	10.23 (3.27)	6.42 (2.59)	4.42 (2.21)	2.85 (1.81)	5.98 (2.47)
T_{10}	500 g	11.89 (3.52)	16.87 (4.16)	10.75 (3.34)	8.59 (3.00)	7.85 (2.86)	11.01 (3.34)
T_0		11.91 (3.52)	17.27 (4.25)	18.18 (4.30)	14.27 (3.81)	10.30 (3.27)	15.00 (3.90)
CD(P=0.05)	-	NS	0.57	0.52	0.34	0.22	0.33

Figures in parentheses are $\sqrt{X + 0.5}$ transformed values
Mean of three replications based on two sprays

Table 3. Cost benefit ratio of the different insecticidal treatments in gall midge, on rice var. Leimaphou (KD-2-6-3)', during *Kharif*, 2014.

Treatment	Dose (g/ha)	Yield (t/ha)	Yield increase over control	Cost of increased yield over control (Rs./ha)	Control cost (Rs./ha)	Net profit (Rs./ha)	BCR
T_1	150 ml	5.69	1.74	52200	15540	36660	1:2.35
T_2	200 g	5.52	1.57	47100	15565	31535	1:2.03
T_3	50 g	5.85	1.90	57000	13655	43345	1:3.17
T_4	25 g	4.70	0.75	22500	12655	9845	1:0.78
T_5	50 g	4.95	1.00	30000	12445	17555	1:1.41
T_6	250 ml	5.82	1.87	56100	15620	40480	1:2.59
T_7	100 ml	5.74	1.79	53700	12050	41650	1:3.45
T_8	30 g	5.60	1.65	49500	10850	38650	1:3.56
T_9	100 ml	5.98	2.03	60900	16740	44160	1:2.64
T_{10}	500 g	4.40	0.45	13500	8040	5450	1:0.68
T_0		3.95					

Market price of Rice grain = Rs 30, 000 /t (@ Rs. 30/Kg);
Labour charge for two times insecticides application = Rs. 240 x 2 = 480.00
Pump hiring charge for two times insecticides application = Rs. 100 x 2 = Rs. 200.00.

4. References

Anonymous, 2002. Directorate of Rice Research (DRR), Annual Report, Hyderabad, India.

Anonymous, 2015. International Rice Research Institute, Annual Report, Los Banos, Philippines, 131-148.

Anonymous 2016. Department of Agriculture, Government of Manipur.

Heinrichs EA, Medrano FG and HR Rapusas, 1985. Genetic evaluation for insect resistance in rice. International Rice Research Institute. Los Banos, Philippines.

Himabindu K, Suneetha K, Sama VSAK and JS Bentur, 2010. A new rice gall midge resistance gene in the breeding line CR57-MR1523, mapping with flanking markers and development of NILs. Euphytica 174: 179–187.

IRRI., 2015. World Rice Statistics in 2013. Available at: http://ricestat.irri.org.

Jahn GC and K Bunnarith, 2004. Gall midge in Cambodian lowland rice. In: Bennett J, Bentur JS, Pasalu IC, Krishnaiah K (eds) New approach to gall midge resistance in rice. Proceedings of the International Workshop. 22–24 November, 1998. Hyderabad, India, pp 71–76.

Paul AVN., 2007. Insect pests and their management. Indian Agricultural Research Institute New Delhi.pp.4.

Rani NS, Varaprasad GS, Rao SLV, Sudharshan I, Hariprasad AS, Prasad ASR, Ram T, Babu VR, Padmavathi G, Vijaipal B, Suneetha K and BC Viraktamath, 2011. High Yielding rice varieties of India. DRR technical bulletin 55/2011. Directorate of Rice Research, Hyderabad, p 95.

Seni A and BS. Naik, 2017. Efficacy of some insecticides against major insect pests of rice, Oryza sativa L. *Journal of Entomology and Zoology Studies* 5(4): 1381-1385.

Singh HR., 2010. Effect of Certain Varieties and New Molecules on the Incidence of Major Insect Pests under Rice-Crop-Eco-System of Manipur Valley. M. Sc. Thesis. College of Agriculture, Central Agricultural University, Imphal.

Vijayalakshmi P, Amudhan S, Himabindu K, Cheralu C and JS Bentur, 2006. A new biotype of the Asian rice gall midge Orseolia oryzae (Diptera: Cecidomyiidae) characterized from the Warangal population in Andhra Pradesh, India. *International Journal of Tropical Science* 26: 207–211.