



Varietal Screening of Rice Panicle Mite in Relation to Morphological Characters of Leaf Sheath and Population in 5 major Rice Growing districts of West Bengal

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ABSTRACT: This paper deals with varietal screening in relation to morphological characters of leaf sheath in respect of 29 rice cultivars of early and mid-early duration of rice crop regarding population/2 sq. cm. area of leaf sheath, length of flag leaf, length of panicle and % of chaffy grain. In addition, results of studies on population of panicle mite on 8 median rice cultivars, 10 late duration rice cultivars and 11 long duration rice cultivars are also discussed. Besides, it also includes results regarding population of rice panicle mites in 5 rice growing districts of West Bengal.

Keywords: Rice panicle mite, *Steneotarsonemus spinki*, varietal screening, morphological characters, West Bengal.

INTRODUCTION

The rice panicle mite, *Steneotarsonemus spinki* is presently becoming an important pest of rice in many of the rice growing areas of the world. This mite feeds on the ad-axial surface of the leaf sheath and is known to cause sterile grain syndrome producing loose and brownish flag leaf sheath, twisted panicle neck, impaired grain development with empty or partially filled grain having brownish spots and the loss is reported to be to the tune of 20-25%. Earlier, this mite was not of much problem in West Bengal though, of course, it was a menace in many parts of South India. In West Bengal, this occurs in East and West Midnapore district, South and North 24 Parganas, Hooghly and Nadia. Many of the farmers are not familiar with the symptoms of the mite menace and therefore often does not take adequate measure for its control which cause further yield loss.

In order to survey the occurrence of this mite in different districts of West Bengal along with its relationship with late and long duration rice cultivars as well as relative abundance of this mite in 5 rice growing districts of West Bengal, the present study was undertaken and the present paper is based on those results.

MATERIAL AND METHODS

For conducting this study, the Chinsurah Rice Research Station was selected and the late duration rice cultivars which were chosen were MTU 7029, Swarnasub-1, IET-5656, Sashi, Masuri, Mandira, Sambamasuri, IET-19104, IET-19886, Pooja and the cultivars which were selected for occurrence of long duration crop were

Bhudeb, Ranjit, CN-1039-9, Chapakhashi, Jayaselect, Dinesh, Salibahan, Jalamagna, Sitabhog, Badsabhog, Gobindabhog. A total of 32 cultivars were selected for relative abundance of mites in 5 districts of West Bengal and those were MTU-7029, CR-1009, CR-1017, CR-1018, IET-4786, IET-5656, Jaya, Pankaj, Anjana, GS-1, Masuri, MTU-1047, Swarnasub-1, Sambamasuri, Sambamasuri Sub-1, IR-36, IET-4094, CNRH-8, IR-64, TN-1, LPR-09003, Ratna, Lalat, Dudhsalil, Rupsalil, Jalamagna, Santoshi, Dhanraj, Kathigunjli, Dudhkalma, Dudheswar, CNRH-102. The long duration cultivars which were selected mostly belonged to scented cultivars.

The experiment was laid out in RBD (Randomized Block Design) having 3 replications. The plot size was 3×5 m. and the spacing which was maintained was 15×20 cm. The morphological characters which were taken into consideration were – (i) Length of flag leaf (cm.), (ii) Length of panicle (cm.), (iii) % of chaffy grain both during 2015 and 2016 and population of mite per 2 sq. cm.

RESULT AND DISCUSSION

(a) Mite population/ 2 sq. cm. of leaf sheath (Table 1): So far as mite population/ 2 sq. cm. of leaf sheath on some selected rice cultivars, it was found that ICRH-101 was best because of having poorest mite population and was superior to Jaldi-13, PR-113, PAN-828, SAUAR12E-6444 among those there was no significant difference. The cultivars 27P-37 and IET-4786 had the maximum population and was significantly inferior to all others.

All the cultivars can be arranged from the lowest to highest mite population as below –IKRH-101> Jaldi-13 = PR-113 = PAN-828 = SAUAR12E-6444> MTU-1010 = Anjali> PNR-546 = Ratna = 27P-36 = JKRH-2082> Pravat = IR-72 = CNRH-102 = JKRH-40> IET-4094 = SAUB-226> CNRH-103> 29P-0-1 = 27P-31> PNR-519 = SAUBS-1929> IR-64 = 27P-22> PAN-830> IR-36 = SAUB110-G> IET-4786 = 27P-37.

(b) Mite population in relation to length of flag leaf (Table 1): As regards length of flag leaf, the data are given in the above Table 1. A perusal to the table indicates that IR-72 and JKRH-2082 had the maximum flag leaf length and the minimum flag leaf length was in case of IKRH-101, SAUB-226 and 27P-36, all being significantly at par. Considering the length of flag leaf, the maximum to minimum flag leaf length can be arranged in the following descending order.

IR-72= JKRH-2082> MTU-1010= 27P-31> IET-4786= Ratna= JKRH-40> PANR-519= CNRH-102= SAUB-110G= 27P-37> IR-64= PAN-828= CNRH-103= PAN-

830= SAUBS-1929> PNR-546= 29P-0-1> IET-4094= PR-113= 27P-22> Pravat= Anjali= SAUAR12E-6444> IR-36= Jaldi-13> IKRH-101= SAUB-226= 27P-36.

So, it can be concluded that the variety IR-72 and JKRH-2082 were best and length of flag leaf lamina was not affected due to infestation of *Steneotarsonemus spinki*. Contrary to this, the 3 cultivars viz, IKRH- 101, SAUB-226 and 27P-36 were the most affected cultivars giving minimum flag leaf length, showing adverse effect of mite infestation.

(c) Mite population in relation to length of panicle (Table 1): So far as length of panicle is concerned, the variety PAN-828 had shown its maximum length and better than Ratna. PNR-546, MTU-1010, CNRH-103, 29P-0-1, CNRH-102 and JKRH-40, all of which were significantly at par. The cultivars Jaldi-13, 27P-31, 27P-36, SAUB-226 had shown the minimum panicle length and among themselves they had shown no significant difference.

Table 1 : Incidence of *Steneotarsonemus spinki* Smiley per 2 sq. cm. area in relation to plant morphological characters in early and mid-early duration rice cultivars during the period from 2015-2016.

Sl. No.	Rice cultivars	Mite population/ 2 sq. cm. of leaf sheath	Length of flag leaf (cm.)	Length of panicle (cm.)	% of chaffy grain
1.	IR-36	118.19	19.58	15.40	18.36(25.37)
2.	IET-4786	125.13	33.30	24.76	27.80(30.42)
3.	IR-64	92.40	31.20	25.20	20.84(27.16)
4.	IET-4094	62.76	27.20	18.60	20.15(26.20)
5.	Jaldi-13	11.29	19.50	12.70	42.33(40.18)
6.	Pravat	32.47	26.60	24.40	21.76(27.16)
7.	PNR-519	83.57	32.75	26.40	25.15(30.70)
8.	Ratna	26.13	33.40	27.39	26.14(30.67)
9.	IR-72	30.54	42.30	25.60	24.51(29.65)
10.	PNR-546	29.09	28.80	27.80	43.75(40.71)
11.	MTU-1010	16.38	36.30	30.50	20.85(27.16)
12.	PR-113	12.44	25.50	25.30	37.56(37.40)
13.	Anjali	20.34	22.40	26.20	43.88(40.18)
14.	CNRH-103	66.72	30.50	28.30	50.35(40.87)
15.	CNRH-102	33.90	31.67	27.90	28.90(29.40)
16.	PAN-828	12.19	30.13	35.20	26.20(25.70)
17.	IKRH-101	2.790	17.47	26.60	27.30(24.50)
18.	PAN-830	109.32	31.33	23.50	15.75(20.84)
19.	29P-0-1	77.91	29.33	29.20	27.16(28.79)
20.	27P-31	81.403	35.33	11.01	32.46(31.86)
21.	27P-36	27.19	18.60	14.30	25.37(28.15)
22.	SAUB110G	117.45	32.40	23.77	25.22(24.34)
23.	27P-37	127.07	32.30	26.20	41.17(40.76)
24.	27P-22	90.67	28.30	17.60	27.10(26.14)
25.	SAUB226	60.86	18.40	11.80	30.75(34.51)
26.	SAUAR12E-6444	12.33	25.70	23.30	29.67(26.95)
27.	JKRH-40	33.33	33.85	27.30	31.28(37.75)
28.	SAUS-1929	84.67	31.30	26.30	43.74(41.45)
29.	JKRH-2082	25.24	41.20	24.70	27.33(28.56)
CD at 5%		4.49	1.31	3.78	3.63

The length of panicle from maximum to minimum can be arranged in the following descending order –

PAN-828> Ratna = PNR-546= MTU-1010 = CNRH-103= 29P-0-1 = CNRH-102= JKRH-40> JKRH-2082 = SAUBS-1929 = SAUAR12E-6444 = 27P-37 = SAUB110G = PAN-830 = IKRH-101 = Anjali= PR-113= IR-72= PNR-519= Pravat= IR-64= IET-4786> 27P-22=IET-4094= IR-36> Jaldi-13= 27P-31= 27P-36= SAUB-226.

(d) Percentage of chaffy grain (Table 1): So far as % of chaffy grain among 29 cultivars of rice is concerned, the data have been presented in the Table 1. A perusal to the table indicated that PAN-830 and IR-36 cultivars had the minimum chaffy grains and were superior to all other 27 cultivars while CNRH-103 was the poorest among all showing maximum % of chaffy grains. The % of chaffy grain in different cultivars from the minimum to maximum chaffy grain in the order as mentioned below –

PAN-830 = IR-36< IET- 4094= Pravat= MTU- 1010< IET-4786= IR-64= PNR-519= Ratna= IR-72= PAN-828= IKRH-101= 29P-0-1= 27P-36= SAUB110-G= 27P-22=JKRH-2082< CNRH-102= 27P-31= SAUB-226= SAUAR12E-6444= JKRH-40< PR-113= 27P-37< Jaldi-13= PNR-546= Anjali= SAUBS-1929< CNRH-103.

(a) Mite population/ sq. cm. of leaf sheath (Table 2): So far as mite population/ sq. cm. of leaf sheath area is concerned, the minimum to maximum population among 8 cultivars may be arranged in the following ascending order –

Pratikkha< Triguna< CNRH-102<Jaya< KRH-2= Lalat< Sasyasree< IR-50.

And from that it can be concluded that the variety Pratikkha had the minimum mite population/ sq. cm. of leaf sheath area and IR-50 had the maximum mite population and hence the former variety was the most resistant and the latter was the more susceptible variety.

(b) Mite population in relation to length of flag leaf (Table 2): Regarding length of flag leaf, the pertaining data have been presented in the above Table 2 and a perusal to that Table indicated that the variety KRH-2

had shown the maximum flag leaf length and was superior to IR-50, Pratikkha and Jaya and all these had no significant difference among themselves but the latter three were superior to Sasyasree, Lalat and CNRH-102, the last named 3 cultivars were at par. So, therefore, among the 8 cultivars, there were two cultivars which had shown the best performance having the maximum flag leaf length whereas Sasyasree, Lalat and CNRH-102 had shown the lowest flag leaf length.

KRH-2> IR-50= Pratikkha= Jaya> Triguna> Sasyasree= Lalat= CNRH-102.

(c) Mite population in relation to length of panicle (Table 2): Regarding length of panicle, the relevant data had been presented in Table 2. According to the data recorded, KRH-2 had shown the maximum length of panicle as was found in case of flag leaf length. This was followed by Pratikkha, Sasyasree and CNRH-102 which had shown no significance difference among themselves but were superior to the remaining cultivars like Triguna and Jaya both were statistically at par but superior to IR-50 and Lalat, which two were also at par. So, this can be concluded that as regards length of panicle, KRH-2 was best as was seen in case of flag leaf length and IR-50 and Lalat were the poorest among all.

KRH-2> Pratikkha=Sasyasree=CNRH-102> Triguna= Jaya> IR-50= Lalat.

(d) Percentage of chaffy grain (Table 2): As regards % of chaffy grain, among 8 cultivars which were tested in Rice Research Station, Chinsurah, Hooghly, the data have been presented in Table 2 and from there it appeared that the variety IR-50 and Sasyasree had the lowest chaffy grain % and both were at par. However, the cultivars Jaya, though was inferior to the former two mentioned cultivars but were superior to other remaining 5 cultivars. It also appeared that the cultivars Triguna, Lalat, CNRH-102, Pratikkha had shown the % of chaffy grain of different degrees but there were no significant difference among themselves.

IR-50= Sasyasree> Jaya> Pratikkha= Triguna= Lalat= CNRH-102> KRH-2.

Table 2 : Incidence of *Steneotarsonemus spinki* Smiley in relation to plant morphological characters in medium duration rice cultivars during 2015-2016.

Sl. No.	Rice cultivars	Mite population/ sq. cm. of leaf sheath	Length of flag leaf (cm.)	Length of panicle (cm.)	% of chaffy grain
1	IR-50	72.30	31.90	21.70	21.56(25.96)
2	Pratikkha	10.29	33.10	26.57	34.40(35.54)
3	Triguna	15.14	28.38	24.19	37.05(37.08)
4	KRH-2	42.67	35.00	29.01	50.38(45.33)
5	Sasyasree	67.30	27.70	25.56	21.07(27.02)
6	Jaya	34.60	31.50	24.53	27.41(33.21)
7	Lalat	44.70	26.40	21.40	36.91(37.01)
8	CNRH-102	20.31	27.10	26.25	38.45(36.90)
CD at 5%		2.82	2.22	1.07	5.16

(a) Mite population/ sq. cm. of leaf sheath (Table 3): Regarding mite population/ sq. cm. leaf sheath area, among the 10 cultivars tested in Chinsurah Agriculture farm, the lowest mite population were seen in the cultivars Mandira and Sambamasuri (both being statistically at par) while the variety IET-5656 had shown the maximum mite population. All the 10 cultivars can be arranged in the following ascending order –

Mandira= Sambamasuri< Masuri= Pooja< Sashi= IET-19104= IET-19886< Swarnasub-1< MTU-7029< IET-5656.

Therefore, IET-5656 was the poorest among all and Mandira, Sambamasuri were the best among the tested cultivars.

(b) Mite population in relation to length of flag leaf (Table 3): As regards, length of flag leaf among 10 late duration cultivars of paddy, the relevant data have been presented in Table 3. It appeared from the data that the variety Masuri had the maximum flag leaf length which was superior to 3 cultivars, viz. IET-5656, IET-19104 and IET-19886 and all these 3 cultivars were significantly at par and superior to Swarnasub-1, Sashi, Mandira and Pooja (all these were statistically at par) but were better than MTU-7029 and Sambamasuri. So, regarding flag leaf length Masuri was the best among all the 10 cultivars and Sambamasuri was the poorest among all.

Masuri> IET-5656= IET-19104= IET-19886> Swarnasub-1= Sashi= Mandira= Pooja> MTU-7029= Sambamasuri.

(c) Mite population in relation to length of panicle (Table 3): Regarding length of panicle among 10 late duration cultivars of paddy, MTU-7029, IET-5656, Sashi, Masuri, Mandira, IET-19104, IET-19886 and Pooja were the best having no significant difference among themselves but were definitely superior to Swarnasub-1 and Sambamasuri which two were at par. It appeared that the length of flag leaf in MTU-7029 though was quite poor but regarding length of panicle, the same cultivar proved to be best among all. But Sambamasuri in both the cases was poorest among all the 10 cultivars. The cultivars may be arranged in the following descending order as regards their length of panicle.

MTU-7029= MTU-5656= Sashi= Masuri= Mandira= IET-19104= IET-19886= Pooja> Swarnasub-1= Sambamasuri.

(d) Percentage of chaffy grain (Table 3): Regarding chaffy grain, among 10 late paddy cultivars tested, the variety Mandira was the best among all showing the minimum % of chaffy grain and on the contrary, the cultivars IET-5656 and Sambamasuri were the poorest among all because of having the maximum % of chaffy grain. All the cultivars can be arranged in the following descending order –

Mandira> Sashi= Masuri= Pooja> MTU-7029= Swarnasub-1= IET-19104= IET-19886> IET-5656= Sambamasuri

Table 3: Incidence of *Steneotarsonemus spinki* Smiley in relation to plant morphological characters in late duration rice cultivars during the period from 2015-2016.

Sl. No.	Rice cultivars	Mite population/ sq. cm. of leaf sheath	Length of flag leaf (cm.)	Length of panicle (cm.)	% of chaffy grain
1	MTU-7029	34.46	28.80	25.00	34.46(35.54)
2	Swarnasub-1	30.28	30.05	23.86	31.80(33.71)
3	IET-5656	41.46	34.15	26.15	50.48(43.75)
4	Sashi	17.75	31.50	25.29	27.20(31.09)
5	Masuri	14.45	40.56	27.29	26.23(30.47)
6	Mandira	6.22	30.21	24.50	15.21(22.70)
7	Sambamasuri	6.56	26.80	21.56	52.80(46.07)
8	IET-19104	22.10	35.60	27.40	33.58(35.04)
9	IET-19886	23.70	37.32	25.20	30.14(34.58)
10	Pooja	16.35	30.45	26.35	26.87(28.25)
CD at 5%		3.18	2.13	2.67	2.93

(a) Mite population/ sq. cm. of leaf sheath (Table 4): Regarding mite population/ sq. cm. of leaf sheath in 11 long duration scented cultivars of paddy tested at Rice Research Station, Chinsurah, the relevant data was presented in Table 4. The population was least in the cultivars Ranjit and Jayaselect which were superior to Chapakhashi, Dinesh, Jalamagna and Sitabhog all

showing statistically similar performance. On the contrary, the maximum population was seen in the variety CN-1039-9. The mite population/ sq. cm. of leaf sheath in the ascending order has been presented below- Ranjit= Jayaselect< Chapakhashi= Dinesh= Jalamagna= Sitabhog< Gobindabhog< Salibahan= Badshabhog< Bhudeb< CN-1039-9.

(b) Mite population in relation to length of flag leaf (Table 4): Regarding length of flag leaf among 10 long-duration scented cultivars of paddy, Jayaselect was the best showing the maximum length of flag leaf while Bhudeb, Ranjit, CN-1039-9, Sitabhog, Badshabhog and Gobindabhog were inferior but had no significant difference among themselves. The cultivars

Chapakhashi, Salibahan, Jalamagna and Dinesh though were inferior to Jayaselect but were superior to the remaining cultivars. The cultivars may be arranged in the following descending order -

Jayaselect> Chapakhashi= Salibahan= Jalamagna= Dinesh> Bhudeb=Ranjit= CN-1039-9= Sitabhog= Badshabhog= Gobindabhog.

Table 4 : Incidence of *Steneotarsonemus pinki* Smiley in relation to plant morphological characters in long duration(scented) rice cultivars during the period from 2015-2016.

Sl. No.	Rice cultivars	Mite population/ sq. cm. of leaf sheath	Length of flag leaf (cm.)	Length of panicle (cm.)	% of chaffy grain
1	Bhudeb	31.46	23.31	24.50	22.77(28.26)
2	Ranjit	4.40	20.10	15.88	12.50(21.60)
3	CN-1039-9	41.54	25.37	24.15	32.10(34.90)
4	Chapakhashi	8.76	35.70	21.70	19.25(25.76)
5	Jayaselect	7.25	42.35	22.80	17.40(24.41)
6	Dinesh	11.26	30.55	22.40	19.42(25.90)
7	Salibahan	15.25	32.40	25.40	22.60(30.06)
8	Jalamagna	11.20	35.78	27.60	17.65(26.50)
9	Sitabhog	9.87	26.20	26.65	26.45(33.25)
10	Badshabhog	16.33	26.10	26.50	42.07(38.03)
11	Gobindabhog	12.70	25.70	27.30	26.40(30.50)
CD at 5%		2.95	9.41	13.75	9.75

(c) Mite population in relation to length of panicle (Table 4): Regarding length of panicle among 11 long-duration scented cultivars of paddy, the maximum length of panicle was found in case of variety Jalamagna and the minimum was in case of Ranjit. However, there was no significant statistical difference among the 11 cultivars and hence their performance was at par.

(d) Percentage of chaffy grain (Table 4): Among the 11 cultivars tested for evaluating % of chaffy grain, the relevant data have been presented in Table 4. It appeared that the cultivars Ranjit, Chapakhashi, Jayaselect, Dinesh and Jalamagna had shown no significant difference among themselves and were superior to the remaining cultivars. While Badshabhog was the poorest among all showing maximum % of chaffy grain. The cultivars Bhudeb, Salibahan, Sitabhog and Gobindabhog were superior to Badshabhog but were statistically at par among themselves.

Ranjit= Chapakhashi= Jayaselect= Dinesh= Jalamagna> Bhudeb= Salibahan= Sitabhog= Gobindabhog> CN-1039-9> Badshabhog

The population of panicle mite *Steneotarsonemus pinki* Smiley as recorded on 31 cultivars in 5 rice growing districts of West Bengal was presented in Table 5. A perusal to the Table indicated that the panicle mite was present in all the 5 districts wherefrom observation was recorded.

However, the population of this mite in different cultivars and districts varied as evident from the fact that on MTU-7029 cultivar, the population was very high in West Midnapore district. In other cultivars like

IET-4786, CR-1017 also had higher population. The population of this mite on cultivars like CR-1009, CR-1018, IET-5656, Jaya had moderate population but it was quite low in Dudheswar variety.

In case of East Midnapore district, the maximum population was found on MTU-7029, IET-4786 while medium population was found on CR-1017, CR-1018, IET-5656 and Dudheswar. The cultivars like Dudhkalma, Kathigunjli, Dhanraj, Santoshi which were local cultivars had poor population.

So far as district South 24 Parganas is concerned, high mite population was seen in MTU-7029 and IET-4786 and medium population was recorded on IET-5656, Jaya, GS-1, Masuri and MTU-1047. The local cultivars like Dudhsalil, Rupsalil, Jalamagna had poor population.

In Hooghly district, MTU-7029 was found to be having highest population. Pankaj, Swarnasub-1, Sambamasuri, Sambamasuri sub-1 had the moderate population and the minimum was recorded on LPR-09003.

In Nadia district, IR-36, IET-4786, CNRH-8, TN-1 and Ratna had highest population while the medium population was on cultivars MTU-7029, IET-4094, IR-64 and Lalat.

So, by analyzing the overall data, it can be inferred that MTU-7029, IET-4786, IR-36 were very much susceptible to the rice panicle mite as the population was on higher side in all the 5 districts. Interestingly, the local cultivars in most of the observed districts were found most resistant against this mite.

Table 5: Population of rice panicle mite *Steneotarsonemus spinki* Smiley in 5 rice growing districts of West Bengal during the period from 2015-2016.

Sl. No.	Rice cultivars	Midnapore(West)	Midnapore(East)	24-Parganas(South)	Hooghly	Nadia
1	MTU-7029	++++	+++	+++	+++	++
2	CR-1009	++	-	-	-	-
3	CR-1017	+++	++	-	-	-
4	CR-1018	++	++	-	-	-
5	IET-4786	+++	+++	+++	-	+++
6	IET-5656	++	++	++	-	-
7	Jaya	++	-	++	-	-
8	Pankaj	-	-	-	++	-
9	Anjana	-	-	+	-	-
10	GS-1	-	-	++	-	-
11	Masuri	-	-	++	-	-
12	MTU-1047	-	-	++	-	-
13	Swarnasub-1	-	-	-	++	-
14	Sambamasuri	-	-	-	++	-
15	Sambamasuri sub-1	-	-	-	++	-
16	IR-36	-	-	-	-	++++
17	IET-4094	-	-	-	-	++
18	CNRH-8	-	-	-	-	+++
19	IR-64	-	-	-	-	++
20	TN-1	-	-	-	-	+++
21	LPR-09003	-	-	-	+	-
22	Ratna	-	-	-	-	+++
23	Lalat	-	-	-	-	++
24	Dudhsalil	-	-	+	-	-
25	Rupsalil	-	-	+	-	-
26	Jalamagna	-	-	+	-	-
27	Santoshi	-	+	-	-	-
28	Dhanraj	-	+	-	-	-
29	Kathigunjli	-	+	-	-	-
30	Dudhkalma	-	+	-	-	-
31	Dudheswar	+	++	+	-	-

‘+’ – Low Population, ‘+++’ – High Population,
‘++’ – Medium Population, ‘++++’ – Very High Population.

The results obtained in the present study were compared with those reported by the earlier workers. Some such reports are as follows:

Suresh(2011) evaluated cultivars of rice against rice sheath mite and reported the cultivars like RNR-898, RNR-9038, RNR-8913, RNR-8860, RNR-2458, Godavari, Isukalu, NSN-21184 and NSN-34949 were moderately resistant against panicle mite because of their well exerted panicles and early durations. Ou *et al.* (1977) reported rice grain sterility due to *Steneotarsonemus spinki* in Taiwan. Rao and Prakash (1992) reported the rice cultivars like Karuna, Pankaj, Jaya, Krishna, CRM-25 and Gaurav as susceptible to this mite in Cuttack. Rao *et al.*(2000) while working on rice sheath mite reported the cultivars MTU-1001, MTU-2067, MTU-2077, MTU-7029, BPT-5204 AND PLA-1000 being most susceptible to rice sheath mite in Godavari district of Andhra Pradesh. Ghosh *et al.*(1999) screened the cultivars ISA-40, JUMA-57,

Prosedoca-97 and Prosequisa-41 towards their reproductive phenological phases. Chang (1965) started the various morphological characters of rice cultivars in relation to rice panicle mite. Jhansi *et al.* (2008) reviewed the various aspects of rice panicle mite. According to Lee(1980), the cultivars Kaohsiung Selection No. 1, Hsinchu-57, Chinung-shenyu-19, Nan-shen-yu-42 and Kaohsiung-shen-yu-194 were the most resistant in Taiwan. Chandrasena *et al.* (2016) while conducting studies on rice panicle mite, reported *Cyperus rotundus*, *Leptochloa chinensis*, *Echinochloa crus-galli*, *Paspalum scrobiculatum*, *Imperata cylindrica* etc. as the alternate hosts of this mite. Since the results obtained by various workers regarding screening of rice cultivars against *Steneotarsonemus spinki* do not tally with the rice cultivars selected for the present study, the results obtained by the present workers could not be compared with those published earlier.

Further, no published information was available either regarding responses of different cultivars with regard to date of sowing *vis-à-vis* crop duration and leaf morphological characters. Hence, this study made an attempt for the first time to throw some light in this direction.

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REFERENCES

- Chandrasena, G., Jayawardane, J., Umange, S.D. and Gunawardana, A.D.B.U. (2016). Host range of panicle rice mite *Steneotarsonemus spinki* Smiley (Acari: Tarsonemidae) in Sri Lanka. *Universal Journal of Agricultural Research*, **4**(1): 21-26.
- Chang, T. (1965). The morphology and varietal characteristics of the rice plant, Technical Bulletin **IV**, *International Rice Research Institute*.
- Ghosh, S.K., Rao, J. and Prakash, A. (1999). Incidence of tarsonemid mites in rice ecosystem and their impact on seed quality, *Journal of Acarology*, **15**(1 & 2): 93-98.
- Jhansi, L.V., Krishnaiah, N.V., Pasalu, I.C. and Katti, G. (2008). Bio-ecology and management of rice mites – A review. *Agricultural Reviews*, **29**(1): 31-39.
- Lee, H.C. (1980). Screening for varietal resistance to sterility of rice caused by tarsonemid mite. *Plant Protection Bulletin, Taiwan*, **22**: 91-100.
- Ou, Y.T., Fang, H.C. and Tseng, Y.H. (1977). Studies on *Steneotarsonemus madecassus* Gutierrez of rice. *Plant Protection Bulletin, Taiwan*, **19**: 21-29.
- Rao, J. and Prakash, A. (1992). Infestation of tarsonemid mite in rice in Orissa. *Journal of Zoological Research*, **3**(2): 179-181.
- Rao, P.R.M., Bhavani, T.R.M., Rao, T.R.M. and Reddy P.R. (2000). Spikelet sterility/ grain discolouration in Andhra Pradesh, India. *International Rice Research Notes* **25**, 40. Notes from the fields.
- Suresh, D. (2011). Evaluation of advanced rice cultures and management of panicle mite *Steneotarsonemus spinki* Smiley, Ph.D. thesis, Acharya N.G. Ranga Agricultural University.