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Survey on Spot Blotch Severity of Wheat in Northern Parts of Karnataka

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A B S T R A C T

Survey and surveillance form the basis for any successful plant protection that depends on early detection of disease followed by timely adoption of management measures. Spot blotch caused by *Bipolaris sorokiniana* is an important disease of wheat gaining much importance in Karnataka because of the occurrence of severe outbreak every year. Intensive roving survey was conducted in wheat growing areas of Dharwad, Gadag, Belagavi, Bagalkote and Vijayapura districts of Karnataka, during *rabi*, 2017-18. Results revealed that there was very low severity of spot blotch disease among various districts, taluks, villages surveyed in different wheat growing regions of Karnataka during *rabi* 2017-18.

Introduction

Wheat (*Triticum* spp.; family: Poaceae; centre of origin: Abyssinia) the versatile cereal crop is also described as "the shuffle of life" or "king of cereals". Even today, it occupies primary position among all the cereal crops due to its feeding the mankind. It supplies more nutrients particularly essential amino acids than any other cereal crop. It has attained a premier position in the world for its unique consumable protein *i.e.*, gluten, which is vital for bread making properties of wheat flour, along with the straw which is a major source of nutritious feed for large population of cattle. Karnataka is unique in wheat cultivation wherein all three cultivated species, *viz.*, *Triticum aestivum* L., *T. durum* Shrank and *T. dicoccum* Desm. are grown in tropical climate, characterized by the prevalence of high temperature during the crop growth. In Karnataka, the area under wheat is about 1.74 lakh ha with an annual production of 1.56 mt having productivity of 897 kg/ha (Anon., 2017).

Due to continuous rise in temperature during the wheat growing season and high humidity coupled with winter rains, spot blotch caused by *Bipolaris sorokiniana* is getting favourable conditions to develop aggressively and cause damage to wheat crop at larger scale by

affecting significant yield loss up to 18-50 per cent under favourable conditions (Duvellier *et al.,* 2005).

B. sorokiniana usually induces symptoms on the leaf, sheath and stem but under severe conditions infection may also reach spikes, resulting in low weight, shrivelled grains with black point at the embryo end of kernels (Chand and Joshi, 2004). In Karnataka, about 60 per cent of area is under tetraploid wheat which comprises *T. durum* and *T. dicocucum*. The later one is very susceptible to spot blotch disease. Natural resistance of wheat towards this pathogen is found to be low (Aggarwal *et al.,* 2004). Spot blotch disease is gaining much importance in Karnataka because of the occurrence of severe outbreak every year. It is necessary to undertake survey on spot botch severity of wheat, so that the disease distribution can be understood in order to take up suitable precautionary measures in endemic areas.

Materials and Methods

Intensive roving survey was conducted in wheat growing areas of Dharwad, Gadag, Belagavi, Bagalkote and Vijayapura districts of Karnataka, during*rabi*, 2017-18. Wheat fields on the survey route were visited and the observations were recorded as per following format.

District	Taluk	Village	Variety/ species	Crop stage	Crop grown condition	Leaf blight scoring	Remarks

Observations on spot blotch severity was taken using double digit scale (00-99) developed as a modification of Saari and Prescott's (1975) severity scale as given below:

The scale (0-9) used for scoring spot blotch severity on leaves

Per cent leaf area coverage	Scale	Per cent leaf area coverage	Scale
0	0	50	5
10	1	60	6
20	2	70	7
30	3	80	8
40	4	90	9

During survey spot blotch infected leaf samples were collected from different locations as mentioned in Table 1.

Results and Discussion

Survey on the severity of disease helps to gather information on prevalence, severity and distribution of the disease, pathogen diversity in particular agro-climatic zone. It reveals magnitude of the problem on hand and serves as a precursor for evolving the management strategies. The roving survey was carried out in Dharwad, Gadag, Belagavi, Bagalkote and Vijayapura districts of northern Karnataka during *rabi*2017-18 to assess the status of wheat spot blotch severity under field conditions. In each district various taluks and villages were surveyed and the results pertaining to this survey were presented in Table 2.

Table.1 Isolates of *Bipolaris sorokiniana* collected from different wheat growing areas

Sl. No	State	District	Village/ Research stations	Varieties	Agro-ecological zone (AEZ)
1	Karnataka	Dharwad	Main Agricultural Research Station, University of Agricultural Sciences, Dharwad- 580005	Amruth, Bijaga yellow, Jyothi, IBDSN 140	Peninsular Zone (PZ)
2		Belagavi	Jaikoppa, Ugar, Agricultural Research Station, Arbhavi, Gokak	DWR 39, Local dicocum, DDK 5027, DWR 162	
3		Bagalkote	Agricultural Research Station, Bagalkote, Mudhol, Shindogi	UAS 415, BW (Mudhol), Keerthi	
4	Maharashtra	Pune	Hole farm, Baramati	N-2 305, N-2 316	Peninsular Zone (PZ)
5		Nashik	Agricultural Research Station, Niphad	NIAW 1994	

Table.2 Survey on spot blotch severity of wheat in northern parts of Karnataka during rabi 2017-18

District/ Date of Survey	Taluk	Village	GPS		Elevation (m)	Variety/species	Crop grown condition	Stage of the crop	Leaf blight (DD)	Remarks (Other pests/ diseases observed)
			Latitude (N)	Longitude (E)						
Dharwad 22.12.2017	Dharwad	Mangalagatti	1532.833	07457.836	687	BW	RF	Boot leaf	01	-
		Kurubagatti	1534.321	07457.996	674	Bijaga Yellow	RF	Flowering	01	Foot rot
		Lokur	1535.420	07450.556	662	DWR 2006	RF	Boot leaf	01	Foot rot
		Lokur	1534.989	07458.052	654	Amruth	RF	Boot leaf	00	Termites
		Lokur	1534.966	07457.940	658	BW	RF	Boot leaf	00	Termites
		Garag	1535.353	07457.010	649	DWR 2006	RF	Flowering	00	-
		Tadakod	1536.135	07454.573	677	Amruth	RF	Flowering	00	Leaf rust
		Budarakatti	1538.854	07455.076	696	Amruth	RF	Flowering	00	Foot rot
Dharwad 28.12.2017	Hubballi	Rayapur	1542.804	07504.123	692	Amruth	RF	Flowering	00	Termites, Stem borer
		Rayapur	1525.432	07504.005	678	Amruth	RF	Flowering	00	-
		Sainagar	1523.034	07507.446	658	Amruth	RF	Flowering	00	-
		Bommapur	1521.694	07512.729	638	Amruth	RF	Flowering	00	Foot rot
		Shiraguppi	1521.843	07514.006	625	Amruth	RF	Flowering	00	-

* DD: Double digit scale, RF: Rainfed, IR: Irrigated, RI: Restricted irrigation, BW: Bread wheat, DW: Durum wheat

Contd……

District/ Date of Survey	Taluk	Village	GPS		Elevation (m)	Variety/species	Crop grown condition	Stage of the crop	Leaf blight (DD)	Remarks (Other pests/ diseases observed)
			Latitude (N)	Longitude (E)						
		Shiraguppi	1521.884	07515.394	602	Amruth	RF	Flowering	00	-
		Shiraguppi	1521.748	07516.951	596	Amruth	RF	Flowering	00	-
		Nalawadi	1521.723	07518.639	594	Amruth	RI	Flowering	00	Leaf rust
Dharwad 28.12.2017	Navalgund	Basapur	1529.110	07523.030	605	Amruth	RI	Flowering	00	Stem borer
		Arekurahatti	1529.120	07518.4911	586	Amruth	RI	Flowering	00	-
Gadag 28.12.2017	Gadag	Annigeri	1524.593	07524.900	617	DW	RF	Flowering	00	-
Belagavi 22.12.2017	Bailhongal	Jalikoppa	1544.441	07452.654	645	BW	IR	Boot leaf	01	-
		Nayanagar	1546.246	07452.187	652	BW	IR	Boot leaf	00	-
		Murakumbi	1551.863	07454.507	693	BW	RF	Flowering	00	-
		Muragod	1553.411	07455.542	719	BW	RF	Flowering	00	-
Belagavi 22.12.2017	Gokak	Maladinni	1608.307	07452.469	559	BW	IR	Flowering	00	-
Belagavi 22.12.2017	Athani	Ugar	1638.528	07449.724	535	Trials	IR	Tillering	00	-

District/ Date of Survey	Taluk	Village	GPS		Elevation (m)	Variety/species	Crop grown condition	Stage of the crop	Leaf blight (DD)	Remarks (Other pests/ diseases observed)
			Latitude (N)	Longitude (E)						
Dharwad 06.01.2018	Dharwad	Hebballi/ Govanakopp	1527.881	07504.213	667	DW	RI	Flowering	00	Leaf rust
		Shivalli	1527.467	07509.762	640	Amruth	RF	Flowering	00	Leaf rust
	Hubballi	Dandikoppa	1527.234	07514.593	600	Amruth	IR	Flowering	00	Leaf rust
	Navalgund	Navalgund	1533.862	07522.267	574	Ankur	IR	Flowering	00	Leaf rust, Termites
Gadag 06.01.2018	Navalgund	Navalgund	1533.854	07522.264	571	Amruth	IR	Flowering	00	Leaf rust
	Nargund	Bhairanahalli	1545.000	7525.851	586	DWR 162	IR	Flowering	00	-
Bagalkote 06.01.2018	Badami	Govanakoppa	1552.749	7529887	557	DWR 162	IR	Flowering	00	-
	Bagalkote	Bagalkote	1610.248	7541.911	542	DWR 162	IR	Flowering	00	-
		Sunaga	1618.350	7538.065	554	DWR 162	IR	Flowering	00	-
	Bilagi	Goyanadinni	1622.786	7539.823	532	BW	IR	Flowering	00	-
Vijayapura 06.01.2018	Vijayapura	Ronihal	1632.140	07541.423	586	DWR 162	IR	Flowering	00	
		Mulawad	1637.275	07543.919	626	BW	RF	Flowering	00	-
		Honaganahalli	1639.608	7543.922	589	Bansi	RF	Flowering	00	-

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District/ Date of Survey	Taluk	Village	GPS		Elevation (m)	Variety/species	Crop grown condition	Stage of the crop	Leaf blight (DD)	Remarks (Other pests/ diseases observed)
			Latitude (N)	Longitude (E)						
Dharwad 24.01.2018	Dharwad	Kavalgeri	-	-	-	DW	RF	Flowering	00	Leaf rust
		Marewad	1531.855	07503.064	665	BW	RF	Milky	00	Leaf rust
		Karadigudda	1534.272	07501.805	696	DW	IR	Flowering	00	Leaf rust
		UppinBetageri	1536.267	0700.526	625	DW	RI	Flowering	00	Leaf rust
Belagavi 24.01.2018	Bailhongal	Jalikoppa	1544.451	07452.670	637	DWR 39	IR	Milky	00	Leaf rust
		Nayanagar	1546.220	07452.188	656	BW (KW 51)	IR	Milky	00	Leaf rust
	Saundatti	Murgod	1553.416	07455.540	721	BW	RI	Milky	00	Leaf rust
		Halaki	1555.856	07456.202	725	BW	IR	Flowering	00	Leaf rust
		Yaragatti	1600.752	07500.011	654	DIC	IR	Flowering	00	-
	Gokak	Maladinni	1607.405	07453.501	562	BW	IR	Flowering	00	Leaf rust
		Maladinni	1608.331	07452.474	558	BW	IR	Flowering	00	Leaf rust
		ByaliBasappa	1613.150	07450.381	563	DWR 162	IR	Flowering	00	Leaf rust
	Hukkeri	Rakshi	1614.311	07438.172	653	BW	RI	Flowering	00	-
		Hukkeri	1614.288	07436.572	653	BW	IR	Flowering	00	-
		Sankeshwar	1616.002	07428.100	651	BW	IR	Flowering	00	-

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District/ Date of Survey	Taluk	Village	GPS		Elevation (m)	Variety/species	Crop grown condition	Stage of the crop	Leaf blight (DD)	Remarks (Other pests/ diseases observed)
			Latitude (N)	Longitude (E)						
Dharwad 09.02.2018	Dharwad	Kavalgeri	1529.874	07501.873	686	BW	IR	Milky	00	Leaf rust
		Amminbhavi	1532.694	07503.722	647	DWR 162	IR	Flowering	00	Leaf rust
		Harobelavadi	1536.948	07504.150	619	Amruth	RF	Flowering	00	Leaf rust
Belagavi 09.02.2018	Saundatti	Inamhongal	01538.098	07504.536	622	Amruth	RF	Flowering	00	Leaf rust
		Saundatti	01544.586	07506.659	660	BW	RI	Flowering	00	Leaf rust
		Goravanakolla	01546.882	07508.424	658	DWR 162	IR	Flowering	00	Leaf rust
		Goravanakolla	01546.882	07508.424	658	DWR 162	IR	Flowering	00	Leaf rust
		Benakatti	01553.935	07504.597	619	DWR 162	IR	Flowering	00	Leaf rust
		Benakatti	01553.935	07504.597	619	DWR 162	IR	Flowering	00	-
		Jevapur	01556.950	07502.178	662	DWR 162	RI	Flowering	00	Leaf rust
		Jevapur	01556.950	07502.178	662	DWR 162	RI	Flowering	00	Leaf rust
	Ramdurg	Soplad	01601.031	07504.752	648	BW	IR	Flowering	00	Leaf rust
		Salahalli	01604.006	07512.674	639	DWR 162	IR	Flowering	00	Leaf rust
	Mudhol	Dadanatti	01607.377	07518.384	629	BW	IR	Milky	00	Leaf rust

Contd……

District/ Date of Survey	Taluk	Village	GPS		Elevation (m)	Variety/ species	Crop grown condition	Stage of the crop	Leaf blight (DD)	Remarks (Other pests/ diseases observed)
			Latitude (N)	Longitude (E)						
Bagalkote 09.02.2018	Mudhol	Lokapur	01609.236	07521.144	572	BW	IR	Flowering	00	Leaf rust
		Hebbal	01612.865	07521.103	529	BW	IR	Milky	00	-
Bagalkote 09.02.2018	Mudhol	Jergal	01617.194	07518.879	535	BW	IR	Flowering	00	Leaf rust
		Shirol	01623.768	07516.550	566	Keerti, DWR 162	IR	Flowering	00	Leaf rust
		Madarkhandi	01630.104	07513.962	565	BW	IR	Flowering	00	Leaf rust
	Jamakandi	Yellatti	01629.595	07509.856	537	BW	IR	Flowering	00	Leaf rust
		Rabakavi	1628.176	07507.690	546	BW	IR	Flowering	00	Leaf rust
		Rabakavi	1628.176	07507.690	546	BW	IR	Flowering	00	Leaf rust
	Mudhol	Mahalingpur	01624.700	07506.489	591	BW	IR	Flowering	00	Leaf rust
		Mahalingpur	01624.700	07506.489	591	BW	IR	Flowering	00	Leaf rust
		Rannabelagali	1623.142	07507.986	560	BW	IR	Flowering	00	Leaf rust
		Mudhol	01620.508	07516.084	536	BW	IR	Flowering	00	Leaf rust
		Lakshanatti	01609.081	07521.855	559	BW	IR	Flowering	00	Leaf rust
		Lakshanatti	01609.081	07521.855	559	BW	IR	Flowering	00	Leaf rust
Belagavi 09.02.2018	Ramdurg	Rankalkoppa	01556.520	07517.352	570	BW	IR	Flowering	00	Leaf rust
	Saundatti	Kallapur	01551.573	07515.828	610	DWR 162	IR	Flowering	00	Leaf rust

Table.3 Monthly meteorological data of Dharwad, Belagavi, Bagalkote, Gadag and Vijayapura districts of rabi2016-17, 2017-18

District	Month	Temperature (°C)			Rainfall (mm)			Relative humidity (%)		
		Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average
Dharwad	October, 2016	34.20	15.50	24.88	12.00	0.00	22.13	100	21.92	70.12
	October, 2017	33.00	18.60	25.63	69.00	0.00	123.53	100	30.50	80.32
	November, 2016	33.70	13.20	24.38	6.00	0.00	10.44	100	14.20	52.80
	November, 2017	33.60	14.30	24.63	4.00	0.00	5.95	100	26.00	66.76
	December, 2016	32.70	13.50	23.84	0.00	0.00	0.17	100	11.70	50.93
	December, 2017	32.10	15.20	23.99	0.00	0.00	0.56	100	27.10	64.56
	January, 2017	33.00	12.00	23.79	0.00	0.00	0.00	94.20	13.40	49.24
	January, 2018	34.20	13.70	24.22	0.00	0.00	0.00	100	20.40	53.87
	February, 2017	38.00	16.00	26.37	0.00	0.00	0.00	100	10.60	47.15
	February, 2018	35.40	15.30	25.44	0.00	0.00	0.65	100	6.60	43.91
	March, 2017	39.20	19.20	29.24	0.00	0.00	0.58	100	8.40	51.11
	March, 2018	37.90	16.90	28.10	0.00	0.00	0.00	100	11.40	55.29
Belagavi	October, 2016	29.20	15.20	22.59	18.50	0.00	33.83	99.40	30.50	69.71
	October, 2017	30.50	17.40	24.50	47.50	0.00	85.33	94.60	26.50	71.18
	November, 2016	30.50	12.70	21.89	11.00	0.00	10.74	99.20	21.30	57.63
	November, 2017	30.80	14.40	23.33	0.00	0.00	2.29	89.20	28.50	60.10
	December, 2016	29.00	10.00	21.26	0.50	0.00	0.56	94.10	17.10	56.59

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District	Month	Temperature (°C)			Rainfall (mm)			Relative humidity (%)		
		Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average
	December, 2017	29.30	13.00	21.95	1.50	0.00	1.53	90.90	23.50	58.29
	January, 2017	29.10	12.10	21.48	0.00	0.00	0.00	88.90	20.70	55.25
	January, 2018	29.80	13.90	22.28	0.00	0.00	0.00	90.80	21.70	54.99
	February, 2017	32.80	15.30	23.96	0.00	0.00	0.00	91.60	15.10	47.33
	February, 2018	32.30	14.50	23.94	0.00	0.00	0.00	89.60	8.00	43.48
	March, 2017	34.50	12.20	25.11	0.00	0.00	0.90	91.90	13.30	48.95
	March, 2018	35.70	17.90	26.04	0.00	0.00	0.00	89.90	11.20	47.85
Bagalkote	October, 2016	30.30	13.20	22.39	3.50	0.00	4.15	83.90	9.30	51.82
	October, 2017	33.60	16.90	27.06	29	0.00	146.94	99.90	38.20	77.77
	November, 2016	30.50	9.90	20.66	0.00	0.00	0.09	80.40	4.90	44.16
	November, 2017	33.60	14.90	24.84	0.50	0.00	4.31	97.90	33.70	68.51
	December, 2016	29.40	8.40	19.97	0.00	0.00	0.00	77.70	2.00	45.90
	December, 2017	33.20	11.30	23.53	2.00	0.00	1.36	98.20	33.10	67.49
	January, 2017	33.80	9.10	21.71	0.00	0.00	0.00	93.30	14.40	55.27
	January, 2018	34.50	12.60	23.65	0.00	0.00	0.00	98.70	28.50	63.53
	February, 2017	36.80	12.70	25.28	0.00	0.00	0.00	92.80	15.80	54.91
	February, 2018	38.00	15.40	26.36	0.00	0.00	0.00	78.70	0.80	37.80
	March, 2017	40.20	14.60	28.75	0.00	0.00	0.01	90.60	14.00	50.55
	March, 2018	40.50	17.90	29.29	1.00	0.00	1.25	93.90	16.50	52.17

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District	Month	Temperature (°C)			Rainfall (mm)			Relative humidity (%)		
		Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average
Gadag	October, 2016	30.50	4.60	24.37	0.00	0.00	0.00	96.80	13.70	54.84
	October, 2017	32.50	6.60	27.37	32.00	0.00	98.27	98.80	37.50	77.30
	November, 2016	30.30	11.90	24.63	0.00	0.00	0.08	88.10	14.50	41.06
	November, 2017	33.30	14.80	25.82	0.00	0.00	1.58	88.60	14.50	42.06
	December, 2016	29.50	17.30	24.76	4.50	0.00	1.96	78.20	10.30	41.63
	December, 2017	33.00	11.50	23.58	1.40	0.00	1.43	88.88	14.86	43.80
	January, 2017	30.90	14.50	24.21	0.00	0.00	0.15	77.20	17.70	38.03
	January, 2018	33.70	14.90	24.46	0.00	0.00	0.00	81.60	12.30	40.80
	February, 2017	34.30	14.60	24.83	0.00	0.00	0.00	86.80	8.60	33.52
	February, 2018	35.10	17.20	26.48	9.50	0.00	2.80	66.40	10.00	35.00
	March, 2017	36.90	14.60	25.73	0.00	0.00	0.00	94.20	4.10	45.30
	March, 2018	39.70	19.20	28.96	9.00	0.00	38.30	87.80	10.00	40.11
Vijayapura	October, 2016	32.20	16.60	25.10	4.00	0.00	5.50	100	25.40	65.94
	October, 2017	32.60	18.20	26.42	21.50	0	89.00	100	31.30	77.37
	November, 2016	33.30	14.10	23.80	0.00	0.00	0.00	99.50	14.90	48.81
	November, 2017	32.80	15.20	24.32	22.50	0.00	22.50	100	26.80	61.12
	December, 2016	32.50	13.10	23.30	0.00	0.00	0.00	100	11.70	50.57
	December, 2017	31.10	15.50	22.80	15.50	0.00	15.50	100	25.20	60.11
	January, 2017	33.00	13.00	23.32	0.00	0.00	0.00	90.90	13.50	45.70
	January, 2018	33.10	14.10	23.74	0.00	0.00	0.00	89.00	18.70	48.47
	February, 2017	37.40	17.40	26.31	0.00	0.00	0.00	76.80	10.30	35.83
	February, 2018	35.00	15.40	25.36	0.00	0.00	0.00	75.70	10.00	39.00
	March, 2017	40.50	14.50	28.70	0.00	0.00	0.00	100	9.70	30.18
	March, 2018	39.20	18.30	28.69	7.00	0.00	8.50	97.70	12.00	42.23

Dharwad district

Among various taluks *viz.*, Dharwad, Hubballi and Navalgund taluk surveyed within Dharwad district, only two villages in Dharwad taluk *viz.*, mangalagatti and kurubagati had scoring of 01 for spot blotch disease.

The first digit 0 indicates that flag leaf has zero per cent disease and second digit 1 means flag-1 leaf has 10 per cent disease. The rest of the villages under Dharwad, Hubballi and Navalgund taluks had 00 scoring which means no appearance of spot blotch.

Gadag district

Gadag, Navalgund and Nargund taluks were surveyed in this district. Among various villages surveyed within each taluk *viz.*, Annigeri village within Gadag taluk, Navalgund village in Navalgund taluk and Bhairanahalli village in Nargund taluk none of the villages had spot blotch disease.

Belagavi district

Bailhogal, Gokak, Athani, Saundatti, HukkeriRamdurg and Mudhol taluks were surveyed in this district.

Among various villages surveyed within each taluk *viz.*, Murakumbi, Muragod, Jalikoppa and Nayanagarvillages within Bailhongal taluk, Maladinni, ByaliBasappa villages within Gokak taluk, Ugarkhurd village within Athani taluk, Murgod, Halaki, Yaragatti and Kallapur villages within Saundatti taluk, Rakshi, Hukkeri and Sankeshwar villages within Hukkkeri taluk, Soplad, Salahalli and Rankalkoppa villages within Ramdurg taluk, Dadanatti village within Mudhol taluk none of the villages had spot blotch disease. All villages had 00 scoring indicating absence of spot blotch.

Bagalkote district

Badami, Bagalkote, Bilagi, Mudhol and Jamakandi taluks were surveyed in this district.

Among various villages surveyed within each taluk *viz.*, Govanakoppa village in Badami taluk, Bagalkote and Sunaga villages in Bagalkote taluk, Goyanadinni village in Bilagi taluk, Lokapur, Hebbal, Jergal, Shirol, Madarkhandi, Mahalingpur, Rannabelagali, Mudhol and Lakshanatti villages in Mudhol taluk, Yellatti and Rabakavi villages in Jamakandi taluk none of the villages had spot blotch disease.

Vijayapura district

Vijayapura taluk was surveyed in this district. Among various villages surveyed within Vijayapura taluk *viz.*, Ronihal, Mulawad and Honaganahalli none of the villages had spot blotch disease.

Overall survey results revealed that there was very low severity of spot blotch disease among various districts, taluks, villages surveyed in different wheat growing regions of Karnataka during *rabi* 2017-18. The reason for the low appearance of spot blotch disease in different districts surveyed during *rabi* 2017-18 may be correlated with weather parameters like temperature, relative humidity and rainfall (Table 3). There was variation in maximum monthly temperature and average relative humidity of October, November and December months of 2017 when compared to October, November, December months of 2016. These variations in temperature, relative humidity may not be congenial for pathogen development and expression of various symptoms of the disease. Such variations in the disease severity have also been observed by earlier workers (Patil, 2000; Meli 1993).

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