



PREVALENCE OF SUCKING PESTS ON HYBRID MAIZE WITH RESPECT TO CROP GROWTH STAGES

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Abstract

To study the prevalence of major sucking pests on hybrid maize and to realize the relationship between phenological crop growth stages field survey was conducted during *Kharif* and *Rabi*, 2014- 2016 in Telangana, India. Twenty potential maize growing villages from four different districts namely Karimnagar, Warangal, Rangareddy and Medak were earmarked for the survey. Infestation pattern of sucking pests various with the crop growth stages, however similar trend was observed in all the districts.

Key words: Hybrid Maize, sucking pests, aphids, growth stages of maize.

Introduction

Maize (Queen of cereals) is a gluten free cereal and one of the finest sources of dietary fibre, vitamins, minerals and ferulic acid, an anti-cancerous phenolic agent. It is also a staple food for millions of people across the world (Roy *et al.*, 2008; Ridhi Kataria, 2014). The production of maize is constantly increasing because of the raising demand from the industries. It is estimated that by the year 2020 the demand for maize in developing countries will suppress the demand for both wheat and rice (James, 2003). Hybrid maize is damaged by an array of insect groups with different feeding habits right from the seedling stage to maturity of the crop, no single strategy is sufficient to manage such complex group of insect-pests. Thus, enormous efforts are needed to cater the needs of maize farmers. Sucking pests especially aphids are widely distributed and appear in serious form occasionally during drought years. Maize plants at the end of mid whorl stage are usually attacked by aphids. The aphid colony sometime covers completely the emerging tassels and the surrounding leaves and preventing the emergence of cob (Ikisan, 2018). Lutfallah *et al.* (1993) recorded high infestation of *R. maidis* in the tasselling stage during the pollination period (70 days after sowing) on maize in Egypt. Ding *et al.* (2002) found among the four aphid species

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attacking on the maize plants. *R. maidis* was the dominant species.

Materials and Methods

Experimental location

The study was under taken in four districts of Telangana (the second largest state in maize production) *viz.*, Karimnagar, Warangal, Medak and Ranga Reddy during *Kharif* and *Rabi* seasons between 2014 - 2016.

District	Latitude °N	Longitude °E	MSL (M)	Average rainfall (mm)
Karimnagar	18.4386	79.1288	279	794.6
Warangal	18.0000	79.5833	258	799.1
Medak	18.0459	78.2633	467	675.8
Renga Reddy	17.2231	78.2827	515	587.7

In each district, five potential maize growing villages were selected. The villages selected were Karimnagar (Ibrahimpatnam, Thimmapur, Jagitial, Choppadandi, Gopalraopet) Warangal (Kadaverugu, Narsakkapally, Vellampally, Katrapally, Chintalapally), Medak (Tupran, Gajwel, Mulugu, Wargal, Dandupally) and Ranga Reddy (Shamirpet, Medichal, Peddamal, Chevella, Vikarabad).

Experimental details

In each village one-hectare hybrid maize (*Kharif* -

P3501/ P3396; *Rabi* - 25K50) was grown without insecticide sprays in the farmers' field for survey and maintained with recommended agronomic practices. Surface irrigation was done to the crop which was raised in rows of 60cm apart and the distance within a row of 25cm. In total, 20 ha of maize were maintained in each season in 20 above mentioned locations.

Scouting of sucking pests was done at various growth stages and not based on the age intervals of the crop. Because, the growth stages are modified by the soil fertility of the particular village. Observations were done during morning/evening hours (7 to 9am/ 4 to 6pm) by avoiding the border 5 rows. Five spots of 5x5m were marked in cross wise section randomly and from each plot 50 plants were randomly observed. In total 250 plants were observed per hectare. Percent infestation was calculated by number of infested plants /total number of plants observed \times 100.

Maize was mainly divided into 18 vegetative (Emergence-VE to Tassel - VT) and 7 (R1 to R6) reproductive stages. Vegetative period in maize is described using the leaf collar method, which is defined by the number of collars on the plant. Leaves are counted from the lowermost first (rounded-tip) leaf to the uppermost leaf with a leaf collar, which is the connection between the leaf blade and the leaf sheath. The leaves in the whorl that are not fully expanded are not counted. In the survey observations were made in selected five stages which is vulnerable for pest attack and are as indicated below.

Scouting	Observation schedule in Vegetative & Reproductive stages
First scouting	2 leaf (V2) collar of the 1 st true leaf to 6 leaf (V6) collar of 6 th leaf visible
Second scouting	7 leaf (V7) collar of 7 th leaf visible – 12 leaf (V12) collar of 12 th leaf visible
Third scouting	VT (Tassel stage)
Fourth scouting	R1- R3 (Silking to Milky stage)
Fifth scouting	R4-R6 (Dough to Physiological maturity)

Results and Discussion

Three major sucking pests *viz.*, aphids, thrips and mites was observed at various crop growth stages in Karimnagar, Warangal, Medak and Ranga redy districts of Telangana during *Kharif* and *Rabi*. With regard to aphid infestation, maximum plants were infested at VT (10.7%) and R-R3 stage (8.28%) which declined to 1.35 % in R4-R6 stage. Thrips infestation was high in VT stage (3.33%) and level of infestation is similar in V2-V6, V7-V12 and R1-R3 stages (0.60%). Mites infestation

was high during V7-V12 stage (1.65%) and nil during R4-R6 stages. Though the infestation pattern of sucking pests was similar in all districts of Telangana, high aphid infestation was found in VT (16.5%) and R1-R3 stages (12%) in Karimnagar district.

In general aphid infestation was high in *Rabi* season compared to other sucking pests. High levels of aphid infested plants were recorded during VT (22.33%) and R1-R3 (15.5%) stages. No infestation was observed during V2-V6 stages. Thrips infestation was recorded

Trend line of sucking pest prevalence on hybrid maize with respect to crop growth stages

Sucking Pest	Stage of maximum Incidence
Aphid - <i>Rhopalosiphum maidis</i>	VT and R1-R3 stages
Thrips – <i>Frankliniella</i> spp.	V6-V10 stage
Mite – <i>Tetranychus</i> spp.	R1-R3 stage

Table 1: Prevalence of sucking pests on hybride maize with respect to crop growth stages during *Kharif* (Mean of two seasons).

District	Stage of the crop	Percent infested plants		
		aphids	thrips	mites
Karimnagar	V2-V6	0.00	0.00	0.00
	V7-V12	6.40	2.40	0.00
	VT	16.50	3.10	0.00
	R1-R3	12.00	0.00	0.00
	R4-R6	3.00	0.00	0.00
Warangal	V2-V6	0	2.40	0.00
	V7-V12	2.3	0.00	3.40
	VT	8.2	4.20	3.90
	R1-R3	6.5	0.00	5.10
	R4-R6	2.4	0.00	0.00
Medak	V2-V6	0	0.00	3.70
	V7-V12	6.8	0.00	3.20
	VT	9.7	0.50	0.00
	R1-R3	8.3	0.00	0.00
	R4-R6	0	0.00	0.00
Ranagreddy	V2-V6	0	0.00	0.00
	V7-V12	7.3	0.00	0.00
	VT	8.4	5.50	0.00
	R1-R3	6.3	2.60	0.00
	R4-R6	0	0.00	0.00
Telangana (Pooled data)	V2-V6	0.00	0.60	0.93
	V7-V12	5.70	0.60	1.65
	VT	10.70	3.33	0.98
	R1-R3	8.28	0.65	1.28
	R4-R6	1.35	0.00	0.00

Table 2: Prevalence of sucking pests on hybride maize with respect to crop growth stages during *Rabi* (Mean of two seasons).

District	Stage of the crop	Percent infested plants		
		Aphids	Thrips	Mites
Karimnagar	V2-V6	0.00	0.00	0.00
	V7-V12	7.70	2.30	0.00
	VT	22.60	0.00	2.70
	R1-R3	14.20	0.00	1.50
	R4-R6	0.00	0.00	0.00
Warangal	V2-V6	0	0.00	0.00
	V7-V12	5.4	4.20	0.00
	VT	28.3	0.00	0.00
	R1-R3	16.3	0.00	3.20
	R4-R6	0	0.00	0.00
Medak	V2-V6	0	2.60	0.00
	V7-V12	13.2	1.06	0.00
	VT	23.5	0.00	6.50
	R1-R3	15.4	1.20	0.00
	R4-R6	2.50	0.00	0.00
Ranagreddy	V2-V6	0	0.00	0.00
	V7-V12	6.2	1.20	0.00
	VT	14.9	2.20	0.00
	R1-R3	16.1	0.00	4.60
	R4-R6	1.4	0.00	0.00
Telangana (Pooled data)	V2-V6	0.00	0.65	0.00
	V7-V12	8.13	2.19	0.00
	VT	22.33	0.55	2.30
	R1-R3	15.50	0.30	2.33
	R4-R6	0.98	0.00	0.00

during V7-V12 (2.19%) and mite infestation was observed during R1-R3 stages (2.33%). Infestation pattern of sucking pests was similar in all districts of Telangana, however relatively low aphid infestation was found in VT (14.9%) and R1-R3 stages (16.1%) in Ranga reddy district.

The present investigation revealed that aphid infestation was high compared to other sucking pests. High levels of aphid infested plants were recorded during VT and R1-R3 stages. Thrips infestation was recorded during V7-V12 and mite infestation was observed during R1-R3 stages. The findings are in line with Atiyeh *et al.*

(1996) the aphid population was significantly higher at the silk stage (8.29 aphid leaf-1) on maize. Similar results were reported by Ramachandra (2013) that aphid attack was not seen up to 35 days but afterward pest attack was dominantly recorded, and aphid population reached peak at 60 DAS *i.e.* 57.27 plant-1 in maize.

It was observed in the present study that the aphid infestation was high from tasselling to grain milky stages. These results are in line with the reports of Bessin (2004) who observed corn leaf aphids very common in whorl stage with apparent Infestation when tassels begin to emerge revealing colonies of aphids. He also observed a physiological damage correlating with yield loss when infestation is high during one or two weeks prior tasselling.

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