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## Survey on soybean stem fly, *Melanagromyza sojae* incidence in Vidarbha region

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### Abstract

The roving survey was carried out in soybean growing tracts of Vidarbha. i.e. Akola, Washim, Buldhana and Amravati districts during flowering and harvest stage of soybean crop in Kharif 2018 and Kharif 2019. During Kharif 2018, at flowering stage of soybean crop the highest stem fly infestation to the extent of 38.80% (16.00 to 58.08%) was recorded in Buldhana district, whereas, the lowest stem fly infestation was observed to the tune of 27.20 per cent. Similarly at harvest stage, the maximum percent of stem fly infestation was observed in Buldhana district to the tune of 9.78% and the lowest stem fly infestation was observed in Amravati district 35.42% (16.08 to 54.58%). During Kharif 2019 at flowering stage, the highest stem fly infestation 41.95% (18.08 to 64.80%) was recorded in Buldhana district, whereas, the lowest stem fly infestation to the extent of 27.16% (14.08 to 39.20%) was observed in Akola district. At harvest, the highest stem fly infestation was noticed to the tune of 45.76% (24.32 to 67.52%) in Buldhana district. The lowest stem fly incidence to the extent of 35.36% (28.64 to 52.48%) was recorded in Akola district. During Kharif 2018, the highest stem tunneling due to stem fly was observed in Buldhana district both at flowering (16.21%) and at harvest (18.99%). The lowest stem tunneling to the tune of 14.23% at flowering stage and 16.84% at harvest stage was observed in Washim district. During Kharif 2019, at flowering stage (19.02%) the highest stem tunneling was observed in Buldhana district and minimum stem tunneling (15.67%) was observed in Amravati district, whereas, at harvest stage the highest stem tunneling (22.51%) was observed in Akola district and the lowest stem tunneling (16.83%) was observed in Amravati district.

Keywords: survey, stem fly infestation, stem tunneling, soybean, Melanagromyza sojae, Vidarbha

## Introduction

Soybean, (*Glycine max* (L.) Merril) has become second most important Kharif crop in Vidarbha after cotton playing a key role in synergizing the economy of the region. Soybean belong to the family of leguminaceae is well known as oilseed and pulse crop which is richest and cheapest source of high quality mineral, protein, vitamin and fat. It is unique crop with high nutritional value. It supplies most of the nutritional constituents essential for human growth. Hence, soybean is called as "wonder crop", "golden crop" or "miracle crop". (Nannaware *et al.* 2018) <sup>[5]</sup>. In nutritious point of view it is an excellent source of protein and oil. It is a two-dimensional crop as it contains about 40 to 42% high quality protein and 20 to 22% oil (Motaphale *et al.* 2017) <sup>[4]</sup>.

Soybean, the number one oilseed crop in the world has recently occupied an important place in the edible oil and agriculture economy of the country. In India, soybean growing states are Madhya Pradesh, Maharashtra, Rajasthan, Andhra Pradesh, Karnataka and Chhattisgarh. Among these states Maharashtra ranks second in acreage under soybean after Madhya Pradesh. In Maharashtra total area constitutes 4043.29 hectares area and production was 4550.08 tonnes and productivity 1125 kg/ha in 2018. (Anonymous, 2018a) <sup>[1]</sup>. In Vidarbha region, during 2018 the total area under soybean cultivation was 16427.7 hectares, production of 19959.2 MT and productivity 2329.1 kg/ha in 2018 from the statistical information available (Anonymous, 2018b) <sup>[2]</sup>.

The species of the genus *Melanagromyza* belong to Cyclorraphous (Diptera) of the family Agromyzidae. They are internal plant feeder almost 75% of them are leaf miners and remaining 1/4th feed inside the part of the plant, like stem miners, pod feeders, seed feeders. The stem fly, (*Melanagromyza sojae* Zehntner) is considered as one of the major pests attacking the crop throughout the year causing cent per cent infestation at different growth stages (Singh and Singh, 1990)<sup>[6]</sup>. Therefore, the present investigation was carried out to survey and for surveillance of stem fly in soybean growing areas of Vidarbha region.

A roving survey was undertaken in farmers' fields of different districts of Vidarbha during flowering and harvesting stage of soybean crop (Table 1). One taluka from each district was selected and in each taluka five fields/village were surveyed. In each field 25 spots were surveyed during Kharif 2018 and 2019. Observations were recorded for stem fly incidence on 25 randomly selected plants at each spot and five plants were dissected to observe the stem tunneling during flowering and

harvesting stages. The extent of tunneling was converted to percentage by the following formula (Talekar, 1990)<sup>[7]</sup>.

% Stem fly infestation =  $\frac{\text{No. of infested plants}}{\text{Total number of plants}} \times 100$ 

% Stem tunneling =  $\frac{\text{Main stem length}}{\text{Affected stem length}} \times 100$ 

Sr. No.	Location						
	District	Taluka	Villages				
			Barshitakali				
	Akola		Katkhed				
1.		Barshitakali	Shahapur				
			Sindkhed				
			Dagadparwa				
			Malegaon				
	Washim		Medshi				
2.		Malegaon	Ekamba				
			Aamkhed				
			Shirpur (Jain)				
			Buldhana				
	Buldhana		Deulghat				
3.		Buldhana	Madh				
			Padali				
			Palaskhed				
	Amravati		Nandgaon (Khandeshwar)				
			Singnapur				
4.		Nandgaon (Khandeshwar)	Dhanora				
			Shirpur				
			Maulichor				

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Table 1:	Location	of	district	wise.	roving	survey
	Doethion	· ·	anouroe		10, mg	

Table 2: Survey an	nd surveillance of	stem fly,	Melanagromyza	sojae in '	Vidarbha region
		···· ,			

			2018				2019				
Sr. No		Location		Per cent stem fly		Per cent stem		Per cent stem fly		Per cent stem	
				infestation at		tunneling at		infestation at		tunneling at	
110.			Flowering	Harvest	Flowering	Harvest	Flowering	Harvest	Flowering	Harvest	
1.			Barshitakali	33.92	36.00	15.69	16.94	29.50	33.28	17.38	24.21
			Katkhed	12.16	23.04	9.37	13.54	14.08	28.64	17.01	19.66
	Alcolo	Dorchitakali	Shahapur	42.08	46.00	16.56	18.62	39.20	52.48	19.06	24.70
	Акоїа	Barsmakan	Sindkhed	44.00	45.12	14.53	19.48	31.52	33.12	15.12	24.30
			Dagadparwa	25.92	32.48	15.26	17.04	21.44	29.28	18.02	19.70
			Mean	31.60	36.54	14.28	17.12	27.16	35.36	17.32	22.51
2.		Malegaon	Malegaon	24.00	31.04	11.80	15.50	28.48	37.12	19.58	20.62
			Medshi	34.08	38.88	19.28	16.86	40.48	47.68	14.37	21.73
	Washim		Ekamba	61.92	60.00	18.70	21.57	56.00	64.80	20.64	26.36
	vv asinini		Aamkhed	29.92	33.12	13.80	15.59	24.00	31.36	15.12	18.23
			Shirpur (Jain)	18.08	24.16	7.58	14.67	32.64	37.44	17.20	24.21
			Mean	33.60	37.44	14.23	16.84	36.32	43.68	17.38	22.23
		Buldhana	Buldhana	48.00	44.00	21.80	24.57	46.56	48.32	18.73	26.92
3.	Buldhana		Deulghat	58.08	52.32	17.76	20.25	64.80	67.52	22.94	24.50
			Madh	44.00	46.08	20.66	23.52	46.24	52.16	24.67	20.78
			Padali	28.00	33.44	11.70	15.95	34.56	36.48	16.98	18.69
			Palaskhed	16.00	23.04	9.12	10.68	18.08	24.32	11.77	13.12
			Mean	38.80	39.78	16.21	18.99	41.95	45.76	19.02	20.80
4.	Amravati	Nandgaon (Khandeshwar)	Nandgaon (Khandeshwar)	38.08	43.04	15.64	17.10	45.60	47.68	24.54	23.64
			Singnapur	47.84	54.08	18.04	24.76	55.36	59.04	23.56	21.43
			Dhanora	28.00	34.24	16.95	19.49	26.88	38.72	12.68	17.48
			Shirpur	18.08	16.08	10.43	12.84	17.28	25.92	7.93	11.04
			Maulichor	4.00	19.68	13.80	14.37	20.16	23.20	9.64	10.56
			Mean	27.20	35.42	14.97	17.71	33.05	38.91	15.67	16.83

## **Results and Discussion**

The roving survey was carried out in soybean growing tracts of Vidarbha i.e. Akola, Washim, Buldhana and Amravati districts during flowering and harvest stage of soybean crop in Kharif 2018 and Kharif 2019. (Table 1).

The overall stem fly infestation observed in these four districts ranged in 4.00 to 61.92 per cent at flowering stage and 16.08 to 60.00 per cent at harvest stage of soybean crop during Kharif 2018 (Table 2).

The average stem fly infestation observed in Akola, Washim, Buldhana and Amravati districts was to the tune of 31.60% (12.16 to 44.00%), 33.60% (18.08 to 61.92%), 38.80% (16.00 to 58.08%) and 27.20% (4.00 to 47.84%), respectively during flowering stage in Kharif 2018.

The stem fly infestation at harvest on soybean crop during Kharif 2018 in Akola, Washim, Buldhana and Amravati districts was averaged to the extent of 36.54% (23.04 to 46.00%), 37.44% (24.16 to 60.00%), 39.78% (23.04 to 52.32%) and 35.42% (16.08 to 54.08%), respectively.

The overall stem fly infestation observed on soybean crop of four districts of Vidarbha during Kharif 2019 ranged in 14.08 to 64.80 percent and 23.20 to 67.52 per cent at flowering and harvest stage of the crop, respectively. (Table 2).

In Kharif 2019, the stem fly infestation on soybean crop in Akola, Washim, Buldhana and Amravati districts was averaged to the extent of 27.16% (14.08 to 39.20%), 36.32% (24.00 to 56.00%), 41.95% (18.08 to 64.80%) and 33.50% (17.28 to 55.34%), respectively at flowering stage while, stem fly infestation on soybean crop at harvest stage in Akola, Washim, Buldhana and Amravati districts was in average of 35.36% (28.64 to 52.48%), 43.68% (31.36 to 64.80%), 45.76% (24.32 to 67.52%) and 38.91% (23.20 to 59.04%), respectively.

As regard to the stem tunneling due to stem fly infestation on soybean crop during Kharif 2018, it was observed that during flowering stage of the soybean crop in Akola, Washim, Buldhana and Amravati districts, the stem tunneling induced by stem fly was averaged to 14.28% (9.37 to 16.56%), 14.23% (7.58 to 19.28%), 16.21% (9.12 to 21.80%) and 14.97% (10.43 to 18.04%), respectively. While, the stem tunneling inflicted due to stem fly at harvest stage of soybean crop during Kharif 2018 in Akola, Washim, Buldhana and Amravati districts was in the average of 17.12 (13.54 to 19.48%), 16.84% (14.67 to 21.57%), 18.99% (10.68 to 24.57%) and 17.71% (12.84 to 24.76%), respectively.

During Kharif 2019, the stem tunneling due to stem fly infestation at flowering stage of soybean crop in Akola, Washim, Buldhana and Amravati districts was averaged to the tune of 17.32% (15.12 to 19.06%), 17.38% (14.37 to 20.64%), 19.02% (11.77 to 24.67%) and 15.67% (7.93 to 24.54%), respectively.

The stem tunneling due to stem fly on soybean crop at harvest during Kharif 2019 in Akola, Washim, Buldhana and Amravati districts was averaged to the tune of 22.51% (19.66 to 24.70%), 22.23% (18.23 to 26.36%), 20.80% (13.12 to 26.92%) and 16.83% (10.56 to 23.64%), respectively.

The findings of the present investigations as regard to stem fly infestation based on survey in different soybean growing tracts of Vidarbha could not be corroborated with the other workers for want of published literature. However, Jadhav (2012) had reported the stem fly incidence at variables levels in different locations of Karnataka of average of as minimum as around 11.70 per cent and more and stem tunneling as minimum as 7.19 per cent and ranged as high as from 55.36 to

67.56 per cent and stem tunneling of 26.65 to 33.02 per cent in Belgaum district of Karnataka during Kharif 2006 and 2007 which is in agreement with report of present investigation pertaining to the level of stem fly infestation and stem tunneling in the cultivator fields.

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