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To study abundance of groundnut pod borers

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Abstract

The investigations on to study the abundance of groundnut pod borers was carried out at Department of Agricultural Entomology, Oilseed Research Station, Latur during year, 2021-2022. The insect pests associated with groundnut in *kharif* season was earwig, wireworm and subterranean ant. The earwig and wireworm was dominant in Oilseed Research Station, Latur. The pest was observed damaging the pods of groundnut. The incidence of groundnut pod borers was high ranged between 0 to 40 percent in research plot. Earwig pod damage recorded between 0 to 40 percent in *kharif* season, wireworm damage recorded in the range 0 to 36 percent in *kharif* season, subterranean ants pod damage in the range of 0 to 33.33 percent in *kharif* season 2021-2022. Damage symptoms of each groundnut pod borers was described based on position, size, shape of holes on pod, nature, extent of damage to kernel, and also other distinguishing features like type of excreta and nature of plugging in the pod. The pod damage due to earwig and wireworm was more in *kharif* season.

Keywords: Earwig, Wireworm, Subterranean ants, Abundance, Pod damage

Introduction

Groundnut (*Arachis hypogaea* L.) an important oilseed and ancillary food crop of the world belongs to genus *Arachis* tribe *Aeschynomene*, family *Fabaceae*, is a tetra foliate legume crop with yellow sessile flowers and subterranean pods. Groundnut is native to South America. In India, groundnut is mostly grown in five states *viz.*, Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka and Maharashtra. Groundnut is actually a stifling plant and requires an extended and hot growing period with optimum temperature (25 to 30 °C) and optimum rainfall (500 mm) (Weiss, 2000) [7]. It is the most important commercial crop mostly grown in semi-arid tropical regions like India. Globally groundnut covers 316 lakh hectares area with the production of 536 lakh tonnes with the productivity of 1699 Kg ha⁻¹ (FAOSTAT, 2021) [3]. India covers 61 lakh hectares area with the production of 99 lakh tonnes with the productivity 1631 Kg ha⁻¹(FAOSTAT, 2021) [3]. In Maharashtra, it is cultivated over an area of 309 thousand hectares with production of 407 thousand tonnes and with average productivity of 1318 kg/ha during *kharif* and *rabi* season, respectively. In Latur district it is cultivated over an area of 26 hectares with production of 18 tonnes and with average productivity of 697 kg/ha during *Kharif* season. (Anonymous, 2021) [1]. Several insect pests attack the groundnut crop that may cause moderate to severe damage (Javed *et al.*, 2014) [4]. The groundnut pod borers contain a wide group of insects which are associated with different class of Insecta. They are mainly the earwigs, wireworms, false wireworms, termites, white grubs, and subterranean ants etc. Earwig feeding on groundnut Kernel by boring into the pods (Cherian and Basheer, 1940) [2]. The larva of wireworms and false wireworms feed on groundnut roots. Subterranean ant also damage to Kernel. White grubs damage groundnut roots and pods, thereby lowering the quality and quantity of harvested kernels (Wightman and Wightman, 1994) [8]. Termites *O. obesus* (Rambur) are social insects, attack on the tap root, feed out all contents ultimately replacing it with mud (Rawat *et al.*, 1970) [6].

Materials and Methods

The present investigations were conducted at the Department of Agricultural Entomology, Oilseeds Research Station, Latur (MS)-India during *kharif*, 2021-2022 in non-replicated with LGN-1 variety was grown in individual gross plot of size 0.30 x 5.0 sq. m. maintaining net plot of 0.30 x 4.8 sq. m. The spacing between row to row and plant to plant was kept 30 and 10 cm, respectively. The variety were sown on 10th July 2021.

Observations of pod borers damage were recorded on During the *kharif* season, weekly 25 plants will be observed for pod borer damage. The sampling will be done after 60 DAS and will be continued till harvest of the crop. The damaged pods will be separated from the plants and will be collected in polythene bags for further examination. The plants will be uprooted at random, following a zig-zag pattern to avoid bias. The damage will be assessed by counting the total number of pods/plant and total number of pods damaged by pod borers.

Table 1: Pod borers associated with groundnut during *kharif* 2021-2022

Sr. No.	Common name	Scientific name	Family	Order
1	Earwig	<i>Euborellia annulipes</i>	Labiduridae	Dermoptera
2	Wireworms	<i>Melanotus communis</i>	Elateridae	Coleoptera
3	False wireworm	<i>Gonocephalum spp.</i>	Tenebrionidae	Coleoptera
4	Subterranean ants	<i>Dorylus labiatus</i>	Formicidae	Hymenoptera

Extent of damage

Groundnut pod borer was recorded at Oilseed Research Station, Latur during the *kharif* seasons of 2021-2022 and the data on percent damaged pods and the insects associated groundnut pod damage are presented in Table 2, 3, 4. In general the incidence of pod borers was high and ranged between 0 to 40 percent. Earwigs, wireworms were predominant pod borers fauna associated with this damage. Earwigs and wireworms contributed more damage compared to subterranean ants. It was also observed that the damage due to borers was more or less consistent irrespective of age of crop and did not indicate clear cut trend in the progress of damage.

The abundance of groundnut pod borer, earwig were dominant species. Earwig recorded in terms of percent pod damage (The percent pod damage was calculated by using the formula suggested by Naresh & Singh (1984) [5] on groundnut are presented in table 2. The activity of earwig commenced from 37 SMW to till harvesting of crop but highest pod damage was observed during 39 SMW. Initially less pod damage was observed which is then followed increasing and reached maximum up to 40 percent during 39 SMW and then gradually decreased. Highest earwig mean pod damage observed at 39 SMW and 40 SMW. Earwig feeding on kernel by boring in to the pods. They mostly preferred immature tender pod. Earwig damage recorded in between 0 to 40 percent in research plot in *kharif* season.

Wireworm also was predominant in *kharif* season. Wireworm recorded in terms of percent pod damage on groundnut are presented in table 3. The wireworm damage activity started on groundnut from 37 SMW to till harvesting of groundnut crop but highest pod damage was observed from 45 SMW to harvesting of the crop. Initially damage was less in research

Results and Discussion

During study, the pod borers associated with groundnut at different growth stages of the crop at Oilseed Research Station, Latur indicated as earwigs, wireworms and subterranean ants. Earwig and wireworm were found to be dominant species in research field. Subterranean ants also recorded from research plot. Pod borers associated with groundnut were given in Table 1.

plot followed by increasing up to harvesting of the crop. Highest mean damage of wireworms recorded at 45 SMW and at the time of harvesting. Wireworm damage recorded in between 0 to 36 percent in research plot in *kharif* season.

The subterranean ant recorded in terms of percent pod damage on groundnut are presented in table 4. The subterranean ant made pin tip size hole on groundnut pods feed on inner content of the pods. The activity of subterranean ant *Dorylus labiatus* commenced from 37 SMW to till harvesting of the crop but maximum pod damage was observed at the 46 SMW. Subterranean ant damage recorded in between 0 to 33.33 percent in research plot in *kharif* season. Initially damage observed less which is followed increasing trend and reached to maximum (33.33%) during harvesting of the crop.

It was also observed that the damage due to borers was more or less consistent irrespective of age of crop and did not indicate clear cut trend in the progress of damage. The abundance of groundnut pod borers, number of bored pods were relatively higher during rainy season. Earwig and wireworm was dominant species followed by subterranean ant.

The observations on incidence of pod borers are recorded at 37 SMW, 38 SMW, 39 SMW, 40 SMW, 41 SMW, 42 SMW, 43 SMW, 44 SMW, 45 SMW and 46 SMW showed severe infestation of pod borers.

Nature of damage

The damage was usually detected until the crop was harvested, it was not always easy to determine which insect caused the damage, especially when the pods were rotting. Nevertheless an attempt were made to characterize the symptoms of damage associated with each pod borer pest.

Table 2: Incidence of percent pod damage due to earwig

Plant Numbers	Standard Meteorological Week									
	37	38	39	40	41	42	43	44	45	46
1	12.50	9.09	0.00	8.33	13.33	11.11	0.00	10.00	5.56	8.00
2	12.50	0.00	14.29	25.00	8.33	9.09	8.33	0.00	4.55	9.09
3	0.00	7.14	15.00	11.76	0.00	17.65	0.00	0.00	0.00	4.00
4	9.09	6.67	27.78	11.11	0.00	0.00	10.00	16.67	5.26	0.00
5	9.09	21.43	8.33	33.33	12.50	11.11	6.67	0.00	0.00	5.56
6	0.00	5.56	0.00	0.00	17.65	0.00	7.69	5.88	10.00	4.55
7	10.00	0.00	11.76	0.00	0.00	11.76	5.00	9.09	0.00	0.00
8	5.88	12.50	9.09	27.27	0.00	5.56	0.00	5.88	9.09	5.00
9	0.00	0.00	0.00	0.00	6.25	6.67	0.00	0.00	6.67	0.00
10	0.00	5.56	9.52	7.69	10.00	18.18	6.67	9.09	0.00	0.00

11	10.00	0.00	0.00	10.53	0.00	0.00	0.00	0.00	5.00	16.67
12	6.67	7.69	9.09	0.00	10.00	0.00	0.00	0.00	0.00	3.70
13	6.25	7.14	15.38	6.67	0.00	0.00	15.38	6.25	9.09	4.00
14	0.00	9.09	0.00	7.14	7.14	0.00	5.56	8.33	0.00	5.00
15	10.53	0.00	0.00	0.00	16.67	9.09	9.09	4.55	0.00	0.00
16	0.00	10.00	9.52	18.75	11.76	0.00	0.00	0.00	13.33	4.55
17	6.67	37.50	0.00	0.00	5.88	7.69	0.00	0.00	0.00	10.00
18	6.25	6.67	10.34	11.11	16.67	5.88	10.00	4.55	11.76	7.69
19	5.88	0.00	40.00	0.00	0.00	22.22	12.50	0.00	7.69	7.14
20	0.00	14.29	7.14	12.50	7.69	0.00	7.14	5.56	9.09	0.00
21	10.00	0.00	0.00	14.29	0.00	9.09	8.33	0.00	8.33	5.56
22	0.00	0.00	36.36	10.00	6.25	11.11	12.50	0.00	11.11	4.76
23	0.00	7.69	9.52	9.09	5.88	5.88	0.00	5.88	10.00	3.70
24	11.11	0.00	9.09	14.29	16.67	9.09	7.14	9.09	0.00	4.76
25	5.56	7.14	15.00	20.00	5.88	6.25	4.35	5.00	9.09	3.85
Mean	5.52	7.01	10.29	10.35	7.14	7.10	5.45	4.23	5.43	4.70

Table 3: Incidence of percent pod damage due to wireworm

Plant Numbers	Standard Meteorological Week									
	37	38	39	40	41	42	43	44	45	46
1	6.25	0.00	7.69	16.67	0.00	11.11	5.56	5.00	11.11	12.00
2	0.00	6.25	0.00	25.00	8.33	9.09	8.33	9.09	9.09	18.18
3	0.00	7.14	5.00	5.88	11.11	11.76	8.33	9.52	36.36	12.00
4	0.00	0.00	0.00	5.56	0.00	15.38	10.00	8.33	5.26	9.09
5	4.55	0.00	8.33	11.11	12.50	33.33	13.33	5.56	4.00	11.11
6	0.00	5.56	0.00	20.00	0.00	12.50	7.69	11.76	5.00	9.09
7	0.00	0.00	0.00	18.18	8.70	0.00	10.00	9.09	11.76	5.88
8	0.00	0.00	9.09	9.09	18.18	11.11	10.53	11.76	0.00	10.00
9	0.00	10.00	0.00	0.00	0.00	6.67	16.67	20.00	6.67	18.18
10	5.88	0.00	4.76	15.38	20.00	9.09	6.67	18.18	18.18	8.33
11	0.00	14.29	7.14	5.26	22.22	16.67	11.11	30.00	15.00	16.67
12	6.67	0.00	0.00	6.25	10.00	16.67	0.00	11.11	13.33	3.70
13	6.25	0.00	0.00	6.67	0.00	0.00	15.38	6.25	27.27	8.00
14	10.00	0.00	0.00	7.14	7.14	5.88	16.67	8.33	18.18	10.00
15	0.00	5.88	4.76	15.38	16.67	9.09	18.18	0.00	18.18	6.25
16	10.00	0.00	0.00	6.25	5.88	0.00	0.00	8.70	0.00	9.09
17	0.00	12.50	8.33	0.00	0.00	15.38	22.22	9.09	5.56	10.00
18	6.25	0.00	3.45	5.56	11.11	11.76	10.00	4.55	11.76	15.38
19	5.88	5.88	0.00	11.11	0.00	0.00	6.25	5.88	0.00	14.29
20	0.00	0.00	0.00	0.00	15.38	0.00	7.14	5.56	9.09	9.09
21	10.00	10.53	0.00	0.00	0.00	18.18	16.67	0.00	8.33	16.67
22	0.00	0.00	18.18	0.00	12.50	0.00	18.75	9.09	11.11	9.52
23	0.00	0.00	0.00	9.09	5.88	11.76	5.88	11.76	10.00	3.70
24	5.56	0.00	0.00	0.00	8.33	9.09	0.00	36.36	6.67	9.52
25	0.00	7.14	10.00	0.00	5.88	18.75	8.70	10.00	9.09	11.54
Mean	3.09	3.41	3.47	7.98	7.99	10.13	10.16	10.60	10.84	10.69

Table 4: Incidence of percent pod damage due to subterranean ants

Plant Numbers	Standard Meteorological Week									
	37	38	39	40	41	42	43	44	45	46
1	0.00	0.00	0.00	8.33	6.67	0.00	0.00	0.00	5.56	4.00
2	0.00	0.00	0.00	12.50	0.00	0.00	8.33	18.18	4.55	18.18
3	0.00	0.00	5.00	0.00	0.00	5.88	8.33	4.76	9.09	8.00
4	0.00	0.00	5.56	5.56	15.38	0.00	0.00	8.33	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	6.67	5.56	4.00	5.56
6	5.88	5.56	0.00	10.00	5.88	12.50	0.00	11.76	0.00	4.55
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.88	11.76
8	0.00	0.00	9.09	0.00	9.09	5.56	10.53	5.88	18.18	5.00
9	0.00	0.00	5.00	14.29	12.50	0.00	0.00	10.00	6.67	18.18
10	5.88	0.00	0.00	7.69	0.00	9.09	0.00	0.00	27.27	33.33
11	0.00	0.00	3.57	10.53	0.00	0.00	22.22	10.00	5.00	0.00
12	0.00	0.00	9.09	6.25	10.00	16.67	14.29	5.56	0.00	7.41
13	0.00	0.00	0.00	0.00	0.00	10.00	0.00	6.25	9.09	0.00
14	0.00	0.00	0.00	7.14	7.14	5.88	5.56	0.00	0.00	5.00
15	5.26	0.00	9.52	7.69	0.00	0.00	9.09	0.00	9.09	25.00
16	0.00	10.00	0.00	0.00	11.76	20.00	0.00	4.35	0.00	9.09
17	0.00	0.00	0.00	6.25	5.88	7.69	11.11	9.09	5.56	0.00

18	0.00	0.00	0.00	0.00	5.56	0.00	0.00	0.00	5.88	15.38
19	0.00	5.88	0.00	0.00	0.00	0.00	6.25	5.88	7.69	14.29
20	0.00	0.00	0.00	0.00	15.38	12.50	0.00	0.00	0.00	9.09
21	0.00	5.26	8.33	0.00	0.00	0.00	8.33	10.00	16.67	5.56
22	16.67	7.14	0.00	10.00	0.00	22.22	6.25	27.27	22.22	4.76
23	0.00	0.00	0.00	0.00	5.88	0.00	5.88	0.00	10.00	7.41
24	5.56	9.09	9.09	0.00	0.00	0.00	14.29	9.09	6.67	4.76
25	0.00	0.00	0.00	10.00	0.00	6.25	0.00	5.00	9.09	7.69
Mean	1.57	1.72	2.57	4.65	4.45	5.37	5.49	6.28	7.53	8.96

Conclusion

In conclusion it was concluded that in the present investigation, the incidence of groundnut pod borers was high ranged between 0 to 40 percent. Earwig pod damage recorded between 0 to 40 percent in *kharif* season, wireworm damage recorded in the range 0 to 36 percent in *kharif* season, subterranean ants pod damage in the range of 0 to 33.33 percent in *kharif* season 2021-2022. Damage symptoms of each groundnut pod borers was described based on position, size, shape of holes on pod, nature, extent of damage to kernel, and also other distinguishing features like type of excreta and nature of plugging in the pod. The pod damage due to earwig and wireworm was more in *kharif* season.

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