OCCURRENCE OF INSECT PESTS AND DISEASES OF GINGER IN NEPAL

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ABSTRACT

A random field survey was conducted from August to September during two consecutive ginger growing seasons in 2011 and 2012 in the major ginger growing districts (Illam, Salyan Palpa, Nawalparasi, Dhankuta, Syanja, Makawanpur, Tanahu and Surkhet) of Nepal. White grub (Phyllophaga spp.), Ginger shoot borer (Dichocrosis punctiferalis Guen.), Red ant (Dorylus sp), Termites (Odontotermes sp) and Leaf roller (Udaspes folus) pest infestation were found in most of the surveyed districts. Rhizome rot (Pythium sp) infestation was found associated with rhizome fly (Calobata sp) in patches in almost all the surveyed districts. Among them white grub and rhizome fly were found economically important insect pests in ginger.

Monitoring of insect species using Sigma energy saving lamp of 18 watt was conducted at National Ginger Research Program (1480 masl), Kapurkot, Salyan during 2011/12. A total of 27 species of insect pests collected through light trap were identified. However, only 6 different insects namely Phyllophaga serricolis Hope, Dorylus orientalis, Xylotrupes gideon L., Anomala xanthroptera Blanchard , Areas galactina orientalis and Nezara viridula L were observed for the population build up trend. Phyllophaga serricolis Hope (38) and Xylotrupes gideon L. (98) showed the highest occurrence in July where as other insect species during June. During winter season no any occurrence of insect species were recorded in Kapurkot condition.

Key words: Ginger, Insect pests, Occurrence, Yield.

INTRODUCTION

Ginger (Zingiber officinale Rosc.) is one of the principle spice crop commercially grown in the mid hills of the Nepal and established as a cash/commercial crop. It is valued for its spicy properties. Illam, Salyan, Palpa, Nawalparasi, Doti are the major ginger growing districts of the country. Ginger is being grown in about 41.61% (20,256 ha) of total major spices cultivated area (48,680 ha) and the production of ginger was recorded 2,55,208 mt with the productivity of 12.60 mt/ha (ABPSD, 2011). Despite the favorable environment available in the mid-hills for production, national productivity is stagnant and could not exceed 12.60 mt/ha. It was due to the several biotic factors mainly rhizome rot, rhizome fly, white grub and other minor diseases and insect pests which are randomly noticed in the farmer's field at various ginger growing places and degradation of soil fertility (GRP, 2010). Total of 32 kinds of insect pests of ginger have been identified in the world but very few of them have been reported in Nepal (CAB, 2007). Dake (1995) has reported that ginger suffers from 24 diseases of fungal, bacterial, viral and mycoplasmal origin. Sharma *et al.* (1998) reported the occurrence of six diseases and five insect pests in ginger field in Nepal. Shoot borer (*Dichocrocis punitiferalis)* was found to be the most destructive insect pests of ginger crop in Nepal (NARC, 1997). Rhizome fly, shoot borer, mites, and white grub were also found associated with the rhizome rot complex of ginger (Sah *et al.*, 2001). From the last decades status of insect pests and diseases are not clearly known in our agro climatic conditions. This paper gives the present status and occurrences of insect pests and diseases on ginger in Nepal.

MATERIALS AND METHODS

Insect pests and disease survey

A survey was carried out by a team of National Ginger Research Program (NGRP), Kapurkot, Salyan, from August-September in two consecutive year 2011 and 2012 in important ginger growing pockets of Illam, Salyan, Nawalparasi, Palpa, Syanja, Tanahu, Dhankuta, Makawanpur and Surkhet district of Nepal. The total number of farmers visited from Salyan, Nawalparasi, Palpa, Syanja and Tanahu districts was 42 in 2011 where as it was 22 in 2012 from Illam, Dhankuta, Makawanpur and Surkhet districts. These districts together constitute about 51.45 % of the area under ginger cultivation in Nepal. The objective of the study was to identify the status of insect pests and major diseases (e.g. Rhizome rot) of ginger in Nepal. All together 64 ginger growing

farmers' field was visited to observe and study the insect pest incidence in standing crop. Insect pests and diseases were identified based on the symptoms, morphology, nature of damage and other distinguishing characters. A set of questions related to the ginger cultivation, insect pests and diseases problems, etc. were prepared and farmers were surveyed. Field incidence was also calculated from crop cut data. However, in this paper, insect pests and disease problems faced by the farmers and also observed by the scientists in the present context are discussed.

Monitoring of insect species through light trap

The study was conducted at National Ginger Research Program (NGRP), Salyan during 2011/12. The light trap was brought from Entomology Division, Khumaltar in which aluminum sheet is folded into a funnel. It was hanged in the field at a height of 1 m from the ground with the help of 3 bamboo sticks and jute rope where the illuminated light can be seen by the insect species. The sigma energy saving lamp of 18 watt was fitted in the center for insect trapping purpose. The light was operated every day from 7 pm to 7 am. Every day insect species were collected from the trap and total numbers were recorded. Insects were sent to Entomology Division for the identification.

RESULTS AND DISCUSSION

Survey of the insect pests and diseases of ginger

The survey showed that ginger is attacked by various insect pests and diseases like rhizome rot in the field condition. Almost all the ginger field was found infested with rhizome rot and rhizome fly. Rhizome rot reported by most of the farmers was the major problem in the field condition. Rhizome rot and rhizome fly were found to be associated with each other with maximum percentage of field infestation of 31.12% and 25 % in Jaubari, Nawalparasi and D. N. P., Dhankuta, respectively. The polyphagous white grub was also found to be emerging problems in almost all the surveyed districts with the highest percentage field infestation of 46.28% in Panchakanya, Illam.

Table: 1 Prevalence of insect pests and diseases in different ginger growing area of Nepal in Sept. – Aug., 2011 and 2012.

VDC and District	# of field surveyed	Insect pests												Disease	
		White grub		Rhizome fly		Red ant		Shoot borer		Termites		Leaf folder		Rhizome rot	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Phalabang, Salyan	7	6	22.71	4	7.14	-	-	4	1.28	-	-	3	0.28	4	13.85
Karangithi, Salyan	5	5	8.8	5	17.8	4	1.6	5	3.0	-	-	3	0.7	5	21.0
Deuchali, Nawalparasi	6	5	1.66	5	13.16	5	2.16	1	0.03	-	-	-	-	6	29.5
Jaubari, Nawalparasi	8	6	5.62	6	14.62	6	3.6	8	2.75	-	-	5	0.56	8	31.12
Khausali, Palpa	6	4	3.16	4	5.75	3	1.37	-	-	1	0.16	1	0.16	6	21.83
Narayannamtales, Palpa	4	-	-	-	0.6	3	1.25	-	-	3	2.0	-	-	4	8.25
Chhanchhandi, Syanja	3	3	-	3	3.66	-	-	3	1.66	2	1.66	-	-	3	21.66
Ghasikuwa, Tanahu	3	1	0.5	2	1.33	1	0.33	-	-	-	-	-	-	3	23.33
D. N. P., Dhankuta	6	3	20.83	5	25.00	2	1.5	4	0.66	-	-	-	-	6	28.5
Panchakanya, Illam	7	5	46.28	2	2.14	1	1.14	1	1.02	-	-	-	-	3	15.0
Bhimphedi, Makawanpur	5	3	4.17	3	7.04	-	-	-	-	-	-	-	-	4	22.6
Lekparsa, Surkhet	4	-	-	3	15.0	4	2.83	-	-	3	1	-	-	4	11.66

A=Infected field number, B = % infestation

Monitoring of insect species through light trap

RESULTS

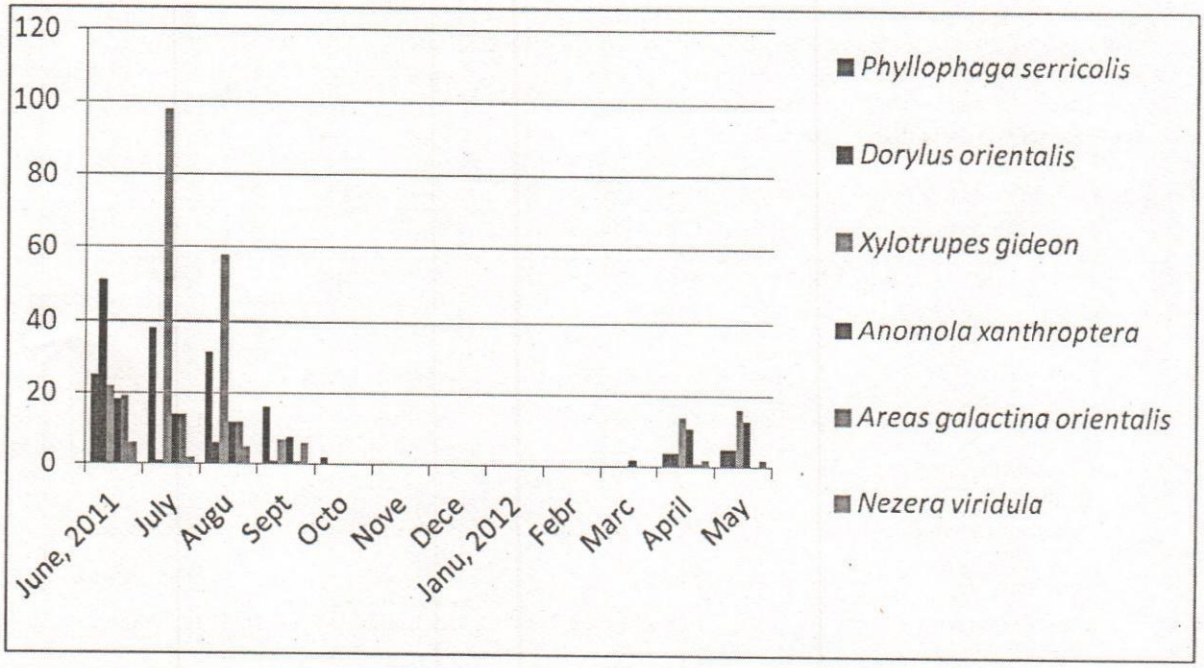
Several species of insects were collected from light trap but only 6 different insect species namely *Phyllophaga serricolis* Hope, *Dorylus orientalis, Xylotrupes gideon* L., *Anomala xanthroptera* Blanchard , *Areas galactina orientalis* and *Nezara viridula* L were recorded to observe the trend of population build up. A total of 27 species of insects were identified (Table 2).

Table 2: The different insect species trapped in light trap at GRP, Salyan during 2011/12.

S.N.	Scientific name	Common name	Family	Order
1.	*Phyllophaga serricolis* Hope	White grub small	Scarabaeidae	Coleoptera
2	*Dorylus orientalis*	Red ant	Formicidae	Hymenoptera
3	*Xylotrupes gideon* L.	Stag beetle	Lucanidae	Coleoptera
4	*Anomala xanthroptera* Blanchard	White grub	Rutellidae	Coleoptera
5	*Areas galactina orientalis* Walker	Tiger moth	Arctiidae	Lepidoptera
6	*Nezara viridula* L.	Green stink bug	Pentatomidae	Hetroptera
7	*Eupterote* sp.	Moth	Eupterotisae	Lepidoptera
8	*Rosalia ttenua*	Long horned beetle	Cerambicidae	Coleoptera
9	*Cretonotus transiens transiens.*	Tiger moth	Arctiidae	Lepidoptera
10	*Vamuna ramelana* Moore	Tiger moth	Arctiidae	Lepidoptera
11	*Eupterote* sp.	Moth	Eupterotisae	Lepidoptera
12	*Spiractia casignata* Kollar	Hairy caterpillar	Arctiidae	Lepidoptera
13	*Lucanus attractus* Hope	Stag beetle	Lucanidae	Coleoptera
14	*Callidula ttenuate* Moore	Moth	Callidulidae	Lepidoptera
15	*Agrotis segetum* Hampson	Cutworm	Noctuidae	Lepidoptera
16	*Ctenicera noxia* Hyslop	Click beetle	Elateridae	Coleoptera
17	*Polycoris baccarum*	Stink bug	Pentatomidae	Heteroptera
18	*Cerura himalayana* Moore	Prominents	Notodontidae	Lepidoptera
19	*Pacna repanda* (small)	Cicada	Cicadellidae	Homoptera
20	*Platylomia* sp (big)	Cicada	Cicadellidae	Homoptera
21	*Dorcus* sp.	Stag beetle	Lucanidae	Coleoptera
22	*Catharsius melosus* L.	Leaf chaffer	Scarabaidae	Coleoptera
23	*Autocrates aeneus* Parry	Beetle	Eupterotidae	Coleoptera
24	*Theretra alecto alecto*	Hawk moth	Sphingidae	Lepidoptera
25	*Phyllophaga rugosa*	Root grubs	Melolonthidae	Coleoptera
26	*Crocotcems surnlia*	Dragonfly	Libellulidae	Odonata
27	*Mantispa sp*	Mantid	Mantidae	Neuroptera

The average occurrence of different insect species in the different month of the year is mentioned in figure 1. *Phyllophaga serricolis* Hope (38) and *Xylotrupes gideon* L. (98) were the highest in number in July where as other insect species namely *Dorylus orientalis (51), Anomala xanthroptera* Blanchard (18), *Areas galactina orientalis* Walker (19) and *Nezara viridula* L (6) showed their highest occurrence during June. During winter season no occurrence of any insect species were recorded. Generally, insect's occurrence was recorded during April to September.

Figurer 1: Average number of insect species collected through light trap at GRP, Salyan during 2011/12



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