The Pharma Innovation Journal 2022; SP-11(10): 1971-1973

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(10): 1971-1973

www.thepharmajournal.com
Received: 15-08-2022
Accepted: 20-09-2022

K Lalruatsangi
Department of Entomology, School of Agricultural Sciences and Rural Development, Nagaland University, Medziphema, Nagaland, India

M Aleminla Ao
Department of Entomology, School of Agricultural Sciences and Rural Development, Nagaland University, Medziphema, Nagaland, India

Corresponding Author:
K Lalruatsangi
Department of Entomology, School of Agricultural Sciences and Rural Development, Nagaland University, Medziphema, Nagaland, India

Effect of date of planting on the incidence of ginger shoot borer, *Conogethes punctiferalis*

K Lalruatsangi and M Aleminla Ao

Abstract
Field experiment was conducted at the Experimental farm, Department of Entomology, School of Agricultural Sciences and Rural Development (SASRD), Nagaland University, Medziphema campus during 2018 and 2019 to study the effect of date of planting on the incidence of ginger shoot borer, *Conogethes punctiferalis.* Experiments were laid out in Split Plot Design. Pooled data revealed that the per cent reduction of *C. punctiferalis* population increased over time. The highest mean per cent reduction (39.24%) in the population of *C. punctiferalis* was observed in D_3 *i.e.* 16th April planting while the lowest total mean per cent reduction was recorded on 15th February planting (D_1) with percent reduction of 36.13%. The mean per cent reduction was recorded to be 37.69% for D_2 *i.e.* 17th March planting.

Keywords: Ginger shoot borer, date of planting, April, February, March

Introduction
Ginger (*Zingiber officinale* Rosc.) belongs to the family *Zingiberaceae* is a herbaceous perennial and an important cash crop grown for its rhizome which is used as a spice. Ginger can be grown both under rain fed and irrigated conditions. However, being an exhausting crop it is not desirable to grow ginger in the same land year after year. The crop grows well at a temperature of 19 °C- 28 °C and a humidity ranging from 70-90% (Devasahayam *et al*., 2012) [1]. The productivity of most of the spice and condiment crops is considerably low in India due to many reasons among which infestation by pests and pathogens is a major factor which causes significant yield losses (Jayashree *et al*., 2015) [4]. Bacterial and fungal diseases, insect pests and parasitic nematodes cause economic losses in ginger cultivation (Nada *et al.*, 1996) [6]. Among the several insect pests reported on ginger, the shoot borer, *Conogethes punctiferalis* Guenee, is the most severe. Crop yield can be significantly affected when more than 45% of shoots in a clump are damaged (Devasahayam *et al*., 2010) [2].
Altering the planting time of the crop as a means of cultural control can result in plants escaping from damaging pest infestations. Normally, insect population fluctuates throughout the cropping season and their activities are mainly confined for a specific period, where they cause significant losses to the crop plants. Consequently, evaluating their damage at different planting dates would help in desynchronizing their emergence with vulnerable/critical stages of the crop growth (Firake *et al*., 2018) [3]. The manipulation of planting time helps to minimize pest damage by producing asynchrony between host plant and pest *i.e.* feeding stage of insect with the susceptible stage of the crop. Proper planting period is an important non-monetary input in crop production. Too early or delayed planting will affect the growth, yield and performance of the crop (Yadav *et al*., 2013) [11]. The yield of ginger has been reported to vary greatly depending on cultivars, climate, planting time and maturity at harvest (Peter *et al*., 2005) [7]. Information regarding insect pests appearance, infestation and its severity of damage in relation to sowing time plays an important role in management of insect pest to a great extent. So, adjusting planting dates of ginger can sometimes help to avoid certain insect infestations and reduce the need for chemical control.

Materials and Methods
The field experiments were conducted at the Experimental farm, Department of Entomology, School of Agricultural Sciences and Rural Development (SASRD), Nagaland University, Medziphema campus during 2018 and 2019 to study the effect of date of planting on the incidence of ginger shoot borer. Experiments were laid out in Split plot Design with three replications keeping planting dates in the main plot and treatments in the sub-plot.

Ginger (cultivar: Nadia) were sown in plot size of 14.5 × 2.8m with spacing of 30 × 30cm (R-R X P-P) during the two consecutive years. Ginger rhizomes were planted in the field with 3 different dates of planting with 3 replications starting from 15th February 2018, with an interval of 30 days.

Infestation of shoot borer was assessed by recording the number of total and affected shoots on each of the ten randomly selected plants per plot and per cent infestation of shoots for each plant was calculated using the formula given below:

$$\text{Infestation (\%)} = \frac{\text{Number of shoots infested per plot}}{\text{Total Number of shoots per plot}} \times 100$$

Result and Discussion

In the first year experimental trial, the highest mean per cent reduction (38.97%) in the population of *C. punctiferalis* was observed in D_3 *i.e.*16th April planting while the lowest total mean per cent reduction was recorded on 15th February (D_1) planting with per cent reduction of 35.78% respectively. It was also observed that the per cent reduction of *C. punctiferalis* population increased over time. The mean per cent reduction was recorded to be 37.24% for D_2 *i.e.* 17th March planting.

In the second year experimental trial, the highest mean per cent reduction (39.50%) in the population of *C. punctiferalis* was observed in 16th April planting (D_3) while the lowest mean per cent reduction was recorded on 15th February planting (D_1) with per cent reduction of 36.48%. The mean per cent reduction was recorded to be 38.13% for 17th March planting (D_2). It was also observed that the per cent reduction of *C. punctiferalis* population increased over time.

The pooled data as indicated in table 3 revealed that for the first spray schedule, all the three different planting dates has significant effect on the population of *C. punctiferalis.* The ginger shoot borer population one day before spray ranges from 4.64 to 5.21. The highest per cent reduction in the population of *C. punctiferalis* was observed at 7 DAS on all the planting dates with per cent reduction of 42.90, 43.62 and 45.69 on D_1, D_2 and D_3. The per cent reduction 5 DAS for D_1, D_2 and D_3 was 35.93, 37.09 and 38.18. The lowest per cent reduction was recorded at 3DAS on all the three planting dates (D_1, D_2 and D_3) with per cent reduction of 24.92, 27.14 and 29.45 respectively. For the second spray schedule, all the three different planting dates has significant effect on the population of *C. punctiferalis.* The ginger shoot borer population one day before spray ranges from 3.69 to 4.00. The highest per cent reduction in the population of *C. punctiferalis* was observed at 7 DAS on all the planting dates with percent reduction of 46.46, 48.40 and 49.03 respectively on D_1, D_2 and D_3. The per cent reduction 5 DAS for D_1, D_2 and D_3 was 37.63, 39.38 and 40.84. The lowest per cent reduction was recorded at 3 DAS on all the three planting dates (D_1, D_2 and D_3) with per cent reduction of 28.95, 30.49 and 32.25 respectively. It was also observed from the pooled data that the per cent reduction of *C. punctiferalis* population increased over time. The highest mean per cent reduction (39.24%) in the population of *C. punctiferalis* was observed in D_3 *i.e.*16th April planting while the lowest total mean per cent reduction was recorded on 15th February planting (D_1) with percent reduction of 36.13%. The mean per cent reduction was recorded to be 37.69% for D_2 *i.e.*17th March planting.

The present findings are in line with the findings of Temjentoshi (2008) [10] who have stated that date of planting ginger has significant effect on the incidence of ginger shoot borer and of all the three different dates of planting studied (31st March, 15th April and 30th April), the 15th April planting recorded the maximum infestation throughout the observation period and minimum infestation was recorded on 30th April planting which agrees to the present findings. Though workers like Mohanty *et al.* (1990) [5], Pruthi (1998) [8] and Yadav *et al.* (2013) [11] have mentioned first fortnight of April as best time of planting ginger for obtaining maximum yield, but no such literature or citations were available on effect of different sowing dates on ginger shoot borer. Peter *et al.* (2005) [7] reported that the yield of ginger vary greatly depending on cultivars, climate, planting time and maturity at harvest. Rekha *et al.* (2016) [9] also reported planting of ginger in March or April with varieties like Maran and Himachal helps in overcoming the rhizome rot disease in ginger and realizing higher yields.

Table 1: Effect of different sowing dates against ginger shoot borer, *C. punctiferalis* on ginger during 2018

Treatments	First spray				Second spray				Mean
	Pre-treatment count	Percent reduction			Pre-treatment count	Percent reduction			
		3 DAS	5 DAS	7 DAS		3 DAS	5 DAS	7 DAS	
Sowing dates									
15th February: (D_1)	5.33	24.92 (27.73)	35.19 (34.09)	42.43 (38.36)	3.62	28.57 (30.02)	37.38 (35.39)	46.22 (40.61)	35.78
17th March: (D_2)	4.67	27.06 (29.15)	36.51 (34.86)	43.06 (38.72)	3.90	29.92 (30.88)	38.83 (36.24)	48.08 (41.75)	37.24
16th April: (D_3)	4.48	29.26 (30.48)	37.87 (35.68)	45.47 (40.18)	4.38	31.75 (32.02)	40.76 (37.39)	48.71 (42.12)	38.97
SEm±	0.18	0.53	0.24	0.41	0.18	0.30	0.25	0.31	-
CD (P=0.05)	NS	2.07	0.95	1.62	NS	1.18	0.99	1.22	-

Note: Figures in the table are mean values and those in parenthesis are arc sine transformed values.
NS: Non-significant at 5% level of significant

Table 2: Effect of different sowing dates against ginger shoot borer, *C. punctiferalis* on ginger during 2019

Treatments	First spray				Second spray				Mean
	Pre-treatment count	Percent reduction			Pre-treatment count	Percent reduction			
		3 DAS	5 DAS	7 DAS		3 DAS	5 DAS	7 DAS	
Sowing dates									
15th February: (D_1)	5.10	24.92 (27.75)	36.67 (34.95)	43.38 (38.91)	3.76	29.32 (30.49)	37.87 (35.68)	46.70 (40.89)	36.48
17th March: (D_2)	4.90	27.22 (29.23)	37.67 (35.53)	44.17 (39.36)	4.10	31.06 (31.57)	39.93 (36.88)	48.71 (42.12)	38.13
16th April: (D_3)	4.81	29.63 (30.69)	38.48 (36.02)	45.90 (40.43)	4.67	32.75 (32.62)	40.92 (37.48)	49.35 (42.49)	39.50
SEm±	0.11	0.31	0.30	0.38	0.19	0.39	0.17	0.40	-
CD (P=0.05)	NS	1.22	1.18	1.49	NS	1.52	0.68	1.58	-

Note: Figures in the table are mean values and those in parenthesis are arc sine transformed values.
NS: Non-significant at 5% level of significant

Table 3: Effect of different sowing dates against ginger shoot borer, *C. punctiferalis* on ginger during 2018 & 2019 (pooled)

Treatments	First spray				Second spray				Mean
	Pre-treatment count	Percent reduction			Pre-treatment count	Percent reduction			
		3 DAS	5 DAS	7 DAS		3 DAS	5 DAS	7 DAS	
Sowing dates									
15th February: (D_1)	5.21	24.92 (27.74)	35.93 (34.52)	42.90 (38.63)	3.69	28.95 (30.25)	37.63 (35.53)	46.46 (40.75)	36.13
17th March: (D_2)	4.79	27.14 (29.19)	37.09 (35.20)	43.62 (39.04)	4.00	30.49 (31.23)	39.38 (36.56)	48.40 (41.93)	37.69
16th April: (D_3)	4.64	29.45 (30.58)	38.18 (35.85)	45.69 (40.31)	4.52	32.25 (32.32)	40.84 (37.44)	49.03 (42.30)	39.24
SEm±	0.10	0.31	0.19	0.28	0.13	0.25	0.15	0.25	-
CD (P=0.05)	NS	1.00	0.63	0.92	NS	0.80	0.50	0.83	-

Note: Figures in the table are mean values and those in parenthesis are arc sine transformed values
NS: Non-significant at 5% level of significant

References

1. Devasahayam S, Eapen SJ, Jacob TK, Pervez R. Zingiberaceous crops (present and future cardamom, ginger, turmeric and others). In: Pests (eds. Singh, H.P., Parthasarthy, V.P., Kandianan, K. and Krishnamurthy, K.S.), Westville publishing house, New Delhi; c2012. p. 332-347.
2. Devasahayam S, Jacob TK, Abdulla Koya KM, Sasikumar B. Screening of ginger (*Zingiber officinale*) germplasm for resistance to shoot borer (*Conogethes punctiferalis*). Journal of Medicinal and Aromatic Plant Science. 2010;32:137-138.
3. Firake DM, Behere GT, Baiswar P. Integrating suitable planting time and Bio-rational pesticides to suppress the pest complex of soybean in Northeast India. Indian Journal of Hill Farming. 2018;31(1):45-51.
4. Jayashree E, Kandiannan K, Prasath D, Rashid Pervez, Sasikumar B, Senthil KCM, *et al*. Ginger. In: Climate and soil (eds. P. Rajeev and Lijo Thomas), Published by Director, ICAR-Indian Institute of Spices Research, Kozhikode, Kerala; c2015. p. 1.
5. Mohanty DC, Naik BS, Panda BS. Ginger research in Orissa with special reference to its varietal and cultural improvement. Indian Cocoa Arecanut Spice Journal. 1990;14(2):61-63.
6. Nada AL, Sharma LR, Dohroo NP, Prashar RS. Status of ginger production in Sirmour district of Himachal Pradesh, UHF, Solan, (H.P), India; c1996. p. 26.
7. Peter KV, Nybe EV, Kurien A. Yield gap and constrains in ginger. In: Ginger the genus *Zingiber* (eds. P.N Ravindran, B.K. Nirmal), CRC Press, Bocaraton; c2005. p. 527-532.
8. Pruthi JS. Major spices of India crop management post-harvest technology. Indian Council of Agricultural Research; c1998. p. 250.
9. Rekha D, Nagaraju, Shreenivasa KR. Effect of planting time and variety on the incidence of giner (*Zingiber officinale* rosc.) rhizome rot complex. Pest Management in Horticultural Ecosystems. 2016;22(2):195-197.
10. Temjentoshi. Effect of dates of planting and ginger cultivars on the infestation of ginger shoot borer, *Dichocrocis punctiferalis* (Guenee). M.Sc. (Ag) Thesis, Nagaland University, School of Agricultural and Rural Development, Medziphema Campus, India; c2008.
11. Yadav AR, Nawale RN, Korake GN, Khandekar RG. Effect of dates of planting and spacing on growth and yield characteristics of ginger (*Zingiber officinale* Ros.) var. IISR Mahima. Journal of Spices and Aromatic Crops. 2013;22(2):209-214.