Original Research Article

Efficacy of Various Ready-mix Insecticides against *Spodoptera litura* (Fab.) in Groundnut

ABSTRACT

A field experiment was carried out to study the efficacy of various ready-mix insecticides against *Spodoptera litura* (Fab.) in groundnut at Main Oilseeds Research Station, JAU, Junagadh during *Kharif*, 2023. Out of the seven ready-mix insecticidal treatments evaluated, chlorantraniliprole 10 + lambda-cyhalothrin 5 ZC 0.006% was found most effective against *S. litura* after two sprays. It recorded the lowest larval population (0.60 larvae/plant), highest pod and haulm yields (1584 and 3286 kg/ha, respectively), highest yield increase over the untreated control (69.95% for pods and 64.66% for haulms) and the highest net realization (₹ 48178/ha). The treatments of novaluron 5.25 + emamectin benzoate 0.9 SC 0.009% and chlorpyriphos 50 + cypermethrin 5 EC 0.11% were proved next best treatments over untreated control. Among the various ready-mix insecticidal treatments, chlorpyriphos 50 + cypermethrin 5 EC 0.11% exhibited the highest ICBR of 1:14.3, followed by chlorantraniliprole 10 + lambda-cyhalothrin 5 ZC 0.006% (1:11.4). However, the treatments *viz*., profenofos 40 + cypermethrin 4 EC 0.088% (1:4.4), novaluron 5.25 + indoxacarb 4.5 SC 0.016% (1:4.3) and emamectin benzoate 5 + lufenuron 40 WG 0.009% (1:2.8) exhibited lower ICBR.

Keywords: Efficacy, Groundnut, S. litura, Ready-mix insecticides

1. INTRODUCTION

Groundnut (*Arachis hypogaea* L.) is a leguminous oilseed crop native to South America. As the king of oilseeds, it is the fourth most important oilseed in the world. It is the largest source of edible oil and ranks 13th among food crops in the world [9]. India comes ranked second to China in terms of groundnut production. Total groundnut cultivated area in India is 45.59 lakh hectares with an annual production of 68.30 lakh tonnes [3]. Of all the groundnut-growing states in India, Gujarat has the largest share in terms of area and production. In Gujarat, the area under groundnut cultivation is 17.09 lakh hectares, with an annual production of 28.14 lakh tonnes and a productivity of 1647 kg/ha [3].

Groundnut yield is affected by direct pest damage or by pests such as disease vectors. More than a hundred insect species have been reported on groundnuts in India [1]. Among the various insect pests infesting this crop in Gujarat, the tobacco caterpillar *Spodoptera litura* is considered the most important pest due to its polyphagous nature and prevailing favorable climate, it occurs throughout the year. The newly hatched and early instar larvae of *S. litura* feed together on the underside of the leaf, resulting in leaf skeletonization and severe leaf destruction in later stages, leaving only petioles and branches, scraping chlorophyll, and causing total yield loss up to 15-30 per cent [7]; more than 180 crops [8].

It is a fact that farmers are dependent upon synthetic insecticides for the control of pests and due to the injudicious use of chemical insecticides; this pest has developed a considerable

level of resistance to conventional insecticides including synthetic pyrethroid [4]. Testing of the combination formulation for their efficacy is very crucial process for the pest management. Rather than using only conventional pesticides, use of combination formulation helps is resistance management which is developed due to continuous use of sole pesticide. Therefore, it is now high time to use certain other pesticides like ready-mix insecticides for its control as well as the lesser chance of development of resistance against them.

2. MATERIAL AND METHODS

To study the efficacy of various ready-mix insecticides against *Spodoptera litura* (Fab.) in groundnut, the variety, GJG-9 was sown at Main Oilseeds Research Station, Junagadh Agricultural University, Junagadh during the *Kharif*, 2023. The experiment was laid out in a Randomized Block Design (RBD) with eight treatments (Table 1) and four replications. Each plot had a gross size of 5 m x 2.7 m and a net size of 4 m x 1.8 m with spacing of 45 cm between rows and 10 cm between plants.

Table 1. Treatment details of insecticides

Tr. No.	Treatment detail	Trade name	Concentration (%)	Dose (ml or gm/10 l)
T_1	Chlorantraniliprole 10 + Lambda-cyhalothrin 5 ZC	Ampligo	0.006	4
T_2	Novaluron 5.25 + Emamectin benzoate 0.9 SC	Gunther	0.009	15
T_3	Novaluron 5.25 + Indoxacarb 4.5 SC	Plethora	0.015	15
T_4	Profenofos 40 + Cypermethrin 4 EC	Polytrin C	0.088	20
T_5	Chlorpyriphos 50 + Cypermethrin 5 EC	Combi-X	0.11	20
T_6	Thiamethoxam 12.6 + Lambda-cyhalothrin 9.5 ZC	Alika	0.007	3
T_7	Emamectin benzoate 5 + Lufenuron 40 WG	Evicent	0.009	2
T_8	Untreated control	-	-	-

2.1 Applications of Insecticides

All ready-mix insecticides were applied in the form of foliar spray with the help of a knapsack sprayer. To decide the quantity of spray fluid required per plot, the control plots were sprayed with water and determined the required spray fluid. Spray fluid was prepared by mixing a measured quantity of water and ready-mix insecticide. The necessary care was taken to prevent the drift of insecticides to reach the adjacent plots. The first spray was done at the initiation of pest population and need base subsequent application was given at 15 days interval.

2.2 Method of recording observations

To evaluate the efficacy of the ready-mix insecticides, observations on the larval population of *S. litura* were recorded on five randomly selected plants of each treatment before and 5, 10, and 14 days after spraying. Further, obtained data was converted into per cent reduction of *S. litura* population over control.

2.3 Yield and Economics

With a view to ascertain the effect of various ready-mix insecticides on the groundnut pod and haulm yield, the crop was harvested from each net plot and weighed separately. The harvested pod and haulm yield were converted into kg per hectare. The percent increase yield over control was also calculated.

The economics of all the treatments were worked out by considering the price of groundnut pod and haulm, cost of insecticides used, and labor charges for spraying of ready-mix insecticides. Incremental Cost-benefit ratio (ICBR) was also worked out to compare the economics of various treatments.

3. RESULTS AND DISCUSSION

3.1 First spray

S. litura populations appeared similar in all treatments before spraying, while treatment differences were not significant during the experiment (Table 2). The larval population before spraying ranged from 2.52 to 2.74 larvae per plant. The pooled throughout 5, 10, and 14 days at first spray exhibited that the treatment with chlorantraniliprole 10 + lambda-cyhalothrin 5 ZC 0.006% was found to be the most effective (0.82 larvae/plant) which was at par with novaluron 5.25 + emamectin benzoate 0.9 SC 0.009% (0.94 larvae/plant). The treatments *viz*., chlorpyriphos 50 + cypermethrin 5 EC 0.11% and emamectin benzoate 5 + lufenuron 40 WG 0.009% were moderately effective, recording larval populations of 1.02 and 1.22 larvae per plant, respectively. While treatment with novaluron 5.25 + indoxacarb 4.5 SC 0.015%, thiamethoxam 12.6 + lambda-cyhalothrin 9.5 ZC 0.007% and profenofos 40 + cypermethrin 4 EC 0.088% were found comparatively less effective against *S. litura* as they recorded the larval population of 1.33, 1.39 and 1.45 larvae per plant, respectively. While the control plot had the highest larval population of 2.33 larvae per plant. The result of the interaction effect suggests that there was a significant difference in the efficacy of treatment over the period due to variable efficacy at different intervals tested.

Per cent reduction over untreated control of *S. litura* after the first spray showed that the highest reduction in *S. litura* population compared to the untreated control was chlorantraniliprole 10 + lambda-cyhalothrin 5 ZC 0.006% (64.95%), followed by novaluron 5.25 + emamectin benzoate 0.9 SC 0.009% and chlorpyriphos 50 + cypermethrin 5 EC 0.11%, with reductions of 59.65 per cent and 56.03 per cent, respectively. In subsequent orders, treatments with emamectin benzoate 5 + lufenuron 40 WG 0.009% and novaluron 5.25 + indoxacarb 4.5 SC 0.015% resulted in reductions of 47.55 per cent and 42.70 per cent over the untreated control. The treatment with thiamethoxam 12.6 + lambda-cyhalothrin 9.5 ZC 0.007% and profenofos 40 + cypermethrin 4 EC 0.088% recorded the lowest reduction over untreated control (40.11% and 37.63%, respectively).

Table 2. Efficacy of various ready-mix insecticides against *S. litura* in groundnut (First spray)

Tr. No.	Treatment	Concentration (%)	Mean number of larvae per plant					Per cent reduction over untreated control
			Before spray	Days after spraying			Pooled over period	
				5	10	14		
T_1	Chlorantraniliprole 10 + Lambda-cyhalothrin 5 ZC	0.006	1.61 (2.58)	0.93 (0.86)	0.77 (0.59)	1.02 (1.03)	0.90 (0.82)	64.95

T_2	Novaluron 5.25 + Emamectin benzoate 0.9 SC	0.009	1.60 (2.57)	1.00 (1.00)	0.85 (0.72)	1.06 (1.12)	0.97 (0.94)	59.65
T_3	Novaluron 5.25 + Indoxacarb 4.5 SC	0.015	1.64 (2.69)	1.18 (1.38)	1.06 (1.12)	1.23 (1.51)	1.16 (1.33)	42.70
T_4	Profenofos 40 + Cypermethrin 4 EC	0.088	1.62 (2.61)	1.22 (1.49)	1.13 (1.27)	1.27 (1.60)	1.21 (1.45)	37.63
T_5	Chlorpyriphos 50 + Cypermethrin 5 EC	0.11	1.63 (2.67)	1.04 (1.08)	0.92 (0.84)	1.08 (1.17)	1.01 (1.02)	56.03
T_6	Thiamethoxam 12.6 + Lambda-cyhalothrin 9.5 ZC	0.007	1.59 (2.52)	1.20 (1.43)	1.09 (1.19)	1.25 (1.57)	1.18 (1.39)	40.11
T_7	Emamectin benzoate 5 + Lufenuron 40 WG	0.009	1.63 (2.65)	1.11 (1.22)	0.99 (1.00)	1.21 (1.45)	1.11 (1.22)	47.55
T_8	Untreated control	-	1.66 (2.74)	1.50 (2.26)	1.52 (2.31)	1.56 (2.42)	1.53 (2.33)	-
S. Em. ±		**T**	**0.07**	**0.05**	**0.05**	**0.05**	**0.03**	**-**
		P	**-**	**-**	**-**	**-**	**0.02**	**-**
		T × P	**-**	**-**	**-**	**-**	**0.05**	**-**
C.D. at 5%		**T**	**NS**	**0.16**	**0.15**	**0.16**	**0.09**	**-**
		P	**-**	**-**	**-**	**-**	**0.05**	**-**
		T × P	**-**	**-**	**-**	**-**	**0.15**	**-**
C.V. (%)		**-**	**9.05**	**9.45**	**10.03**	**8.74**	**9.36**	**-**

Figures in parentheses are original values, while outsides are square root transformed values.
NS: Non-significant

3.2 Second spray

S. litura populations appeared similar in all treatments before spraying, while significant differences among treatments were observed during the experiment (Table 3). The larval population before spraying ranged from 1.03 to 2.42 larvae per plant. The pooled throughout 5, 10, and 14 days at second spray, chlorantraniliprole 10 + lambda-cyhalothrin 5 ZC 0.006% was the most effective treatment (0.60 larvae/plant), which was at par with novaluron 5.25 + emamectin benzoate 0.9 SC 0.009% (0.73 larvae/plant). Moderately effective treatments included chlorpyriphos 50 + cypermethrin 5 EC 0.11% and emamectin benzoate 5 + lufenuron 40 WG 0.009%, which recorded larval populations of 0.84 and 0.95 larvae per plant, respectively. Comparatively less effective treatments against *S. litura* included novaluron 5.25 + indoxacarb 4.5 SC 0.015%, thiamethoxam 12.6 + lambda-cyhalothrin 9.5 ZC 0.007%, and profenofos 40 + cypermethrin 4 EC 0.088%, with larval populations of 1.03, 1.14, and 1.21 larvae per plant, respectively. The control plot had the highest larval population of 2.54 larvae per plant. The result of the interaction effect suggests that there was a significant difference in the efficacy of treatment over the period due to variable efficacy at different intervals tested.

Per cent reduction over untreated control of *S. litura* after the second spray showed that the highest reduction in *S. litura* population compared to the untreated control was chlorantraniliprole 10 + lambda-cyhalothrin 5 ZC 0.006% (76.42%), followed by novaluron 5.25 + emamectin benzoate 0.9 SC 0.009% and chlorpyriphos 50 + cypermethrin 5 EC 0.11%, with reductions of 71.29 per cent and 67.12 per cent, respectively. In subsequent order, treatments with emamectin benzoate 5 + lufenuron 40 WG 0.009% and novaluron 5.25 + indoxacarb 4.5 SC 0.015% resulted in reductions of 62.73 per cent and 59.33 per cent over the untreated control. The treatment with thiamethoxam 12.6 + lambda-cyhalothrin 9.5 ZC 0.007% and profenofos 40 + cypermethrin 4 EC 0.088% recorded the lowest reduction over untreated control (55.02% and 52.46%, respectively).

According to, Gadhiya *et al*. (2014) [6] chlorantraniliprole (0.006%) and emamectin benzoate (0.002%) were noticed to be more effective in protecting the groundnut from the infestation of *S. litura*. Anon. (2022b) [2] concluded that the treatments chlorantraniliprole 10 + lambda-cyhalothrin 5 15 ZC 0.006% and novaluron 5.25 + emamectin benzoate 0.9 6.15 SC 0.009% were found to be the most effective and economical ready-mix insecticides for management of *S. litura* in groundnut. Bhut *et al*. (2023) [5] indicated that the lowest number of larvae/plant was recorded in the treatment of chlorpyrifos 50 + cypermethrin 5 EC 625 + 62.5 a.i./ha which was statistically at par chlorpyrifos 50 + cypermethrin 5 EC 500+50 a.i./ha. Verma *et al*. (2024) [10] revealed that after 1st and 2nd spray, the treatment chlorantraniliprole 10 + lambda-cyhalothrin 5 ZC 250 ml/ha was most effective (0.61 larvae/plant and 0.57 larvae/plant) against *S. litura* in cabbage.

Table 3. Efficacy of various ready-mix insecticides against *S. litura* in groundnut (Second spray)

Tr. No.	Treatments	Concentration (%)	Mean number of larvae per plant					Per cent reduction over untreated control
			Before spray	Days after spraying			Pooled over period	
				5	10	14		
T_1	Chlorantraniliprole 10 + Lambda-cyhalothrin 5 ZC	0.006	1.02 (1.03)	0.88 (0.78)	0.76 (0.59)	0.68 (0.46)	0.77 (0.60)	76.42
T_2	Novaluron 5.25 + Emamectin benzoate 0.9 SC	0.009	1.06 (1.12)	0.99 (0.98)	0.82 (0.67)	0.76 (0.57)	0.85 (0.73)	71.29
T_3	Novaluron 5.25 + Indoxacarb 4.5 SC	0.015	1.23 (1.51)	1.10 (1.21)	1.00 (1.00)	0.95 (0.91)	1.02 (1.03)	59.33
T_4	Profenofos 40 + Cypermethrin 4 EC	0.088	1.27 (1.60)	1.19 (1.41)	1.08 (1.16)	1.04 (1.08)	1.10 (1.21)	52.46
T_5	Chlorpyriphos 50 + Cypermethrin 5 EC	0.11	1.08 (1.17)	1.02 (1.05)	0.89 (0.80)	0.83 (0.68)	0.91 (0.84)	67.12
T_6	Thiamethoxam 12.6 + Lambda-cyhalothrin 9.5 ZC	0.007	1.25 (1.57)	1.16 (1.34)	1.05 (1.09)	1.01 (1.02)	1.07 (1.14)	55.02
T_7	Emamectin benzoate 5 + Lufenuron 40 WG	0.009	1.21 (1.45)	1.08 (1.16)	0.96 (0.91)	0.89 (0.79)	0.97 (0.95)	62.73
T_8	Untreated control	-	1.56 (2.42)	1.58 (2.51)	1.60 (2.55)	1.61 (2.58)	1.59 (2.54)	-
S. Em. ±		**T**	**0.05**	**0.06**	**0.05**	**0.05**	**0.03**	-
		P	**-**	**-**	**-**	**-**	**0.02**	-
		T × P	**-**	**-**	**-**	**-**	**0.05**	-
C.D. at 5%		**T**	**0.16**	**0.16**	**0.15**	**0.15**	**0.08**	-
		P	**-**	**-**	**-**	**-**	**0.05**	-
		T × P	**-**	**-**	**-**	**-**	**0.15**	-
C.V. (%)		**-**	**8.74**	**9.79**	**10.05**	**10.52**	**10.10**	-

Figures in parentheses are original values, while outsides are square root transformed values.

3.3 Yield and economics of various ready-mix insecticidal treatments

3.3.1 Yield

The highest pod and haulm yield (1584 and 3286 kg/ha) (Table 4) was obtained from chlorantraniliprole 10 + lambda-cyhalothrin 5 ZC 0.006% and it was at par with novaluron

5.25 + emamectin benzoate 0.9 SC 0.009% (1451 and 3088 kg/ha). Which was followed by chlorpyriphos 50 + cypermethrin 5 EC 0.11% (1349 and 2951 kg/ha) and emamectin benzoate 5 + lufenuron 40 WG 0.009% (1263 and 2735 kg/ha). Novaluron 5.25 + indoxacarb 4.5 SC 0.015%, thiamethoxam 12.6 + lambda-cyhalothrin 9.5 ZC 0.007% and profenofos 40 + cypermethrin 4 EC 0.088% recorded pod yield of 1195, 1119 and 1072 kg/ha, respectively and haulm yield of 2714, 2651 and 2210 kg/ha, respectively, which was notably higher than the pod and haulm yield of the untreated control of 932 and 1996 kg/ha, respectively.

3.3.2 Increase in yield over untreated control

The treatment of chlorantraniliprole 10 + lambda-cyhalothrin 5 ZC 0.006% recorded the highest per cent yield increase (Table 4) for both pods (69.95%) and haulm (64.66%), followed by novaluron 5.25 + emamectin benzoate 0.9 SC 0.009% (55.67 and 54.72%) and chlorpyriphos 50 + cypermethrin 5 EC 0.11% (44.75 and 47.86%). The treatment of emamectin benzoate 5 + lufenuron 40 WG 0.009% noted a 35.58 and 37.06 per cent increase in pod and haulm yield over untreated control. Conversely, treatments such as novaluron 5.25 + indoxacarb 4.5 SC 0.015%, thiamethoxam 12.6 + lambda-cyhalothrin 9.5 ZC 0.007% and profenofos 40 + cypermethrin 4 EC 0.088% exhibited comparatively lowest per cent increases in both pod and haulm yield over the untreated control.

Table 4. Effectiveness of various ready-mix insecticides on the yield of groundnut pod and haulm

Tr. No.	Treatments	Yield (kg/ha)		Increase in yield over untreated control (kg/ha)		Increase in yield over untreated control (%)	
		Pod	Haulm	Pod	Haulm	Pod	Haulm
T_1	Chlorantraniliprole 10 + Lambda-cyhalothrin 5 ZC	1584	3286	652	1291	69.95	64.66
T_2	Novaluron 5.25 + Emamectin benzoate 0.9 SC	1451	3088	519	1092	55.67	54.72
T_3	Novaluron 5.25 + Indoxacarb 4.5 SC	1195	2714	264	718	28.28	36.00
T_4	Profenofos 40 + Cypermethrin 4 EC	1072	2210	140	214	15.03	10.71
T_5	Chlorpyriphos 50 + Cypermethrin 5 EC	1349	2951	417	955	44.75	47.86
T_6	Thiamethoxam 12.6 + Lambda-cyhalothrin 9.5 ZC	1119	2651	187	656	20.04	32.84
T_7	Emamectin benzoate 5 + Lufenuron 40 WG	1263	2735	332	740	35.58	37.06
T_8	Untreated control	932	1996	-	-	-	-
	S. Em. ±	**66.48**	**163.03**	**-**	**-**	**-**	**-**
	C.D. at 5%	**195.52**	**479.48**	**-**	**-**	**-**	**-**
	C.V. (%)	**10.68**	**12.06**	**-**	**-**	**-**	**-**

3.3.3 Economics of various ready-mix insecticides against *S. litura* on groundnut

The economics of variousready-mix insecticides were worked out along with the incremental cost-benefit ratio (ICBR) (Table 5). The economic analysis of various ready-mix insecticidal treatments showed that chlorantraniliprole 10 + lambda-cyhalothrin 5 ZC 0.006% recorded the highest net realization of 48,178 ₹/ha followed by novaluron 5.25 + emamectin benzoate 0.9 SC 0.009% (38,676 ₹/ha), chlorpyriphos 50 + cypermethrin 5 EC 0.11% (31,463 ₹/ha). The remaining ready-mix insecticides recorded net realizations ranging from 24879 to 10030 ₹/ha. The plots treated with chlorpyriphos 50 + cypermethrin 5 EC 0.11% showed the

highest incremental cost-benefit ratio (ICBR) of 1:14.3, followed by chlorantraniliprole 10 + lambda-cyhalothrin 5 ZC 0.006% (1:11.4), thiamethoxam 12.6 + lambda-cyhalothrin 9.5 ZC 0.007% (1:10.1) and novaluron 5.25 + emamectin benzoate 0.9 SC 0.009% (1:9.7). Rest of the treatments *viz*., profenofos 40 + cypermethrin 4 EC 0.088% (1:4.4), novaluron 5.25 + indoxacarb 4.5 SC 0.016% (1:4.3) and emamectin benzoate 5 + lufenuron 40 WG 0.009% (1:2.8) exhibited lower ICBR and were deemed less economically viable. According to Anon. (2022b) [2] the treatment of chlorantraniliprole 10 + lambda-cyhalothrin 5 15 ZC 0.006% recorded significantly highest pod and haulm yield (1561 and 2688 kg/ha) with highest net return (22288 ₹/ha), while, novaluron 5.25 + emamectin benzoate 0.9 6.15 SC 0.009% and chlorpyriphos 50 + cypermethrin 5 55 EC 0.11% were the next best treatments. Whereas, in point of ICBR treatment chlorpyriphos 50 + cypermethrin 5 55 EC 0.11% noted highest ICBR *i.e.* (1:6.34) followed by the treatment chlorantraniliprole 10 + lambda-cyhalothrin 5 15 ZC 0.006% (1:5.89) and novaluron 5.25 + emamectin benzoate 0.9 6.15 SC 0.009% (1:4.79). Thus, the results of the present findings are more or less in close agreement with earlier findings [12-14].

Table 5. Economics of various ready-mix insecticides against *S. litura* on groundnut

Tr. No.	Quantity of insecticide required for two sprays (l or kg/ha)	Cost of insecticide for 2 sprays (₹/ha)	Total cost of treatment (₹/ha)	Yield (kg/ha)		Gross realization (₹/ha)	Net realization (₹/ha)	ICBR
				Pod	Haulm			
T_1	0.40	3240	4240	1584	3286	117806	48178	1:11.4
T_2	1.50	3000	4000	1451	3088	108304	38676	1:9.7
T_3	1.50	3750	4750	1195	2714	90050	20422	1:4.3
T_4	2.00	1300	2300	1072	2210	79658	10030	1:4.4
T_5	2.00	1200	2200	1349	2951	101091	31463	1:14.3
T_6	0.30	510	1510	1119	2651	84871	15243	1:10.1
T_7	0.20	7995	8995	1263	2735	94507	24879	1:2.8
T_8	-	-	-	932	1996	69628	-	-

Labour charge @ 500 ₹/spray/ha
Market value of ground pod @ 64 ₹/kg and market value of groundnut haulm @ 5 ₹/kg

4. CONCLUSION

Based on the present investigation, it can be concluded that chlorantraniliprole 10 + lambda-cyhalothrin 5 ZC 0.006% proved to be the most effective against *S. litura*. It exhibited the lowest larval population, maximum pod and haulm yield, highest pod and haulm yield increase over the untreated control, and the highest net realization. While the treatments of novaluron 5.25 + emamectin benzoate 0.9 SC 0.009% and chlorpyriphos 50 + cypermethrin 5 EC 0.11% were proved next best treatments over the untreated control. Among the various ready-mix insecticidal treatments, chlorpyriphos 50 + cypermethrin 5 EC 0.11% obtained the highest ICBR of 1:14.3, followed by chlorantraniliprole 10 + lambda-cyhalothrin 5 ZC 0.006% with ICBR of 1:11.4. Therefore, for effective and economical management of *S. litura* in groundnut, the crop should be treated with two sprays of chlorantraniliprole 10 + lambda-cyhalothrin 5 ZC 0.006% at 45 days after sowing, with a 15-day interval between sprays.

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