



Combination of wheel powder and chilli dust for controlling guava spiraling white fly (*Aleurodicus dispersus* Russel)

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ABSTRACT

The study was conducted on the control of guava spiraling white fly (*Aleurodicus dispersus* Russel) by spraying wheel powder (Produced by Liver Brothers Ltd.) and Chilli Dust in the guava orchard at the Farmer's field of Moushuddi, Dhonbari, Tangail during March-September 2016. The two factor experiment consisted of 10 levels of concentrations, viz., control, (2g wheel powder + 1g chilli dust; 4g wheel powder + 1g chilli dust; 6g wheel powder + 2g chilli dust; 8g wheel powder + 2g chilli dust; 10g wheel powder + 2g chilli dust; 15 g wheel powder + 3g chilli dust; 20g wheel powder + 3g chilli dust; 25g wheel powder + 4g chilli dust; 30g wheel powder + 5g chilli dust) litre⁻¹ of water were mixed with tube well water and were sprayed 5, 10 and 20 days after the 1st spray. The experiment was laid out in randomized complete block design (RCBD) with 4 replications having 3-unit plant per replication. The result pertaining to the control of spiraling white fly on guava using wheel powder and chilli dust 10 g wheel powder litre⁻¹ of water with 2 g chilli dust were found more effective without any burning of the guava leaves. The concentration 15g/ litre with 3g chilli dust was medium and 20g, 25g and 30g / litre of water with 3g, 4g and 5g chilli dust were found serious leaf burning, even total leaf dropping after 4th spray respectively. Considering the findings of the experiments under study, the following practices may be recommended for the control of spiraling white fly of guava in Bangladesh: 10 g wheel powder litre⁻¹ of water with 2 g chilli dust is the best doses in controlling white fly.

INTRODUCTION

Guava is an important fruit crop and getting an important commercial fruit in Bangladesh. There are a lot of problems in guava cultivation in Bangladesh among which the guava spiraling white fly (*Aleurodicus dispersus* Russel) has become a serious problem to guava cultivation in Bangladesh. In the recent time, it has been a common and major pest of Kazi Piara, Swarupkathi, Mukundapuri, Kanchannagar, BAU-5 and Thai, a high yielding guava varieties. Severe infestation of this pest may result in defoliation of the whole plant causing serious yield reduction of the fruit crop. Indirectly, the white fly causes reduction of yield by transmitting viral pathogens and through secretion of wax and honey dew, reduces the photosynthetic areas of the plant (Alam *et al.*, 1998). Heavy colonization of white fly may cause a serious indirect damage to the crop due to honeydew excretion on the leaves or on fruit surfaces which encourages growth of the

sooty mould by a fungus, *Capnodium citri* and in turn affects the yield both in quantitative and qualitative way (Byrne *et al.*, 1990, Kajita and Alam, 1996). Among 46 species, 3 species, *Aleurodicus nubilans* (Buckton), *A. spiniferus* (Quaintance) and *A. woglumi* (Ashby) were reported to be the pest of guava in Bangladesh including *Aleurodicus dispersus* (Alam, 1962). From a two time study at the Farmer's field of Moushuddi, Dhonbari, Tangail showed that the incidence and abundant of white fly from May to August. The spiraling whitefly (SWF), *Aleurodicus dispersus* (Russel) is a polyphagous pest with a characteristic spiraling pattern of oviposition on the underside of leaves. The pest is native to Central America, the Caribbean region and the Pacific islands. It was first observed in Florida in 1957 (Russel, 1965). Spiralling whitefly is not actually a fly, but a sap sucking bug, and derives its name from the characteristic egg spirals that the adult whitefly deposits on foliage and fruit. Spiralling whiteflies predominately occur as

a winged adult or whitefly stage and a sedentary nymph stage. Without its natural predators, spiralling whitefly can rapidly assume major pest status.

White fly developed rapidly in warm weather and population can build up quickly in situations where natural enemies are destroyed and weather is favorable. Thus white flies are difficult to manage once their populations has reached high levels and further repeated applications of a product can lead to development of high registrant levels (Ranjith et al.,1996). To control white fly, use of chemicals is common in Bangladesh, which causes hazards to health through residual effect of chemical insecticides. It also creates natural imbalance through killing the beneficial insects. Moreover, sometimes it was for the chemicals, do not control white fly completely (Rahim and Rahman, 2001). So, to save the environment for the better health of the human being and making a friendly environment for the beneficial insect, an attempt was undertaken to control the spiraling white fly of guava by spraying wheel powder, a common, cheap and readily available detergent of Bangladesh.

MATERIALS AND METHODS

The experiment was conducted in the Guava Orchard at the Farmer's field of Moushuddi, Dhonbari, Tangail during March-September 2016. The two factor experiment consisted of 10 levels of concentrations, viz., control, (2g wheel powder + 1g chilli dust; 4g wheel powder + 1g chilli dust; 6g wheel powder + 2g chilli dust; 8g wheel powder + 2g chilli dust; 10g wheel powder + 2g chilli dust; 15 g wheel powder + 3g chilli dust; 20g wheel powder + 3g chilli dust; 25g wheel powder + 4g chilli dust; 30g wheel powder + 5g chilli dust) litre⁻¹ of water were mixed with tube well water and were sprayed 0, 5, 10 and 20 days after the 1st spray. The total population of the insect

was counted before 1st spray, 5 days after 1st spray but before 2nd spray, 10 days after 1st spray but before 3rd spray and 20 days after 1st Spray but before 4th spray as 2nd, 3rd and 4th spray was done 5, 10 and 20 days after 1st spray respectively. Knapsack sprayer was used to spray the wheel powder. It was sprayed during 10-12 am. The experiment was laid out in randomized complete block design (RCBD) with 4 replications having 3-unit plant per replication.

RESULTS AND DISCUSSION

Effect of different concentration

spraying with (10 g wheel powder and 3g chilli dust) litre⁻¹ of water was found most effective after 1st spray having no white fly in guava leaves without any leaf burning followed by (15 g wheel powder and 3g chilli dust) litre⁻¹ of water after 1st spray having no white fly in the leaves with little burning of the leaves (Table 1). Sprayed with (20g wheel powder + 3g chilli dust) litre⁻¹ of water was effective in white fly control causing little, medium and serious leaf burning after 2nd, 3rd and 4th spaying respectively. Spraying (25g wheel powder + 4g chilli dust; 30g wheel powder + 5g chilli dust) litre⁻¹ of water were effective in white fly control causing serious leaf dropping after 2nd, 3rd and 4th spaying respectively.

Effects of frequency of spraying

The effect of different time intervals of spraying of the wheel powder and chilli dust on the control of the guava white fly showed that most effective control was recorded at 4th spray spraying 20 days after the first spray followed by 10 days after the 1st spray (Table 2). The mean number of guava white flies alive after each time intervals of the spray was significantly varied among the treatments.

Table 1

Effect of different concentration of wheel powder and chilli dust on the control of guava white fly after different time intervals of spraying.

Concentrations of detergent	No. of white fly survived /plant after different time intervals of spraying			Leaf burning after different time intervals of spraying		
	5 DAFS	10 DAFS	20 DAFS	5DAFS	10 DAFS	20 DAFS
Control	855	825	860	No	No	No
(2g wheel powder + 1g chilli dust) litre ⁻¹ of water	650.41	615.01	670.48	No	No	No
(4g wheel powder + 1g chilli dust) litre ⁻¹ of water	465.20	455.21	487.32	No	No	No
(6g wheel powder + 2g chilli dust) litre ⁻¹ of water	442.22	432.21	477.56	No	No	No
(8g wheel powder + 2g chilli dust) litre ⁻¹ of water	220.11	180.00	113.23	No	No	No
(10g wheel powder + 2g chilli dust) litre ⁻¹ of water	8.14	3.10	0.00	No	No	No
(15 g wheel powder + 3g chilli dust) litre ⁻¹ of water	2.10	0.00	0.00	No	little	Medium
(20g wheel powder + 3g chilli dust) litre ⁻¹ of water	0.50	0.00	0.00	Little	Medium	Serious
(25g wheel powder + 4g chilli dust) litre ⁻¹ of water	0.00	0.00	0.00	Serious	Serious	Serious
(30g wheel powder + 5g chilli dust) litre ⁻¹ of water	0.00	0.00	0.00	Serious with leaf dropping	Serious	Serious
LSD (0.01) value	9.56	8.96	7.76	-	-	-
Level of significance	**	**	**	-	-	-
DAFS= Days after first spray	** = P<0.01					

Table 2

Effect of frequency of spraying of wheel powder and chilli dust on the control of guava white fly.

Frequency of spraying	No. of white fly survived /plant after different time intervals of wheel powder and chilli dust spraying			Leaf burning after different time intervals of wheel powder and chilli dust spraying		
	5 days after 1 st spray	10 days after 1 st spray	20 days after 1 st spray	5 days after 1 st spray	10 days after 1 st spray	20 days after 1 st spray
Control	788.45	812.36	955.23	No	No	No
Once	205.65	177.56	232.21	No	No	No
Twice	102.23	89.65	70.65	No	No	No
Thrice	65.56	42.21	38.24	No	No	No
LSD (0.01) value	55.65	42.58	63.56	-	-	-
Level of significance	**	**	**	-	-	-

Table 3

Combined effect of different concentrations of wheel powder + chilli dust and frequency of spraying on the control of guava white fly.

Concentration of detergent	Frequency of spraying	No. of white fly survived/plant after different time intervals of spraying			Leaf burning after different time intervals of spraying		
		5 DAFS	10 DAFS	20 DAFS	5 DAFS	10 DAFS	20 DAFS
Control	Once	911.31	945.65	987.77	No	No	No
	Twice	812.21	832.25	878.96	No	No	No
	Thrice	795.89	796.58	858.65	No	No	No
(2g wheel powder + 1g chilli dust) litre ⁻¹ of water	Once	452.59	556.32	601.32	No	No	No
	Twice	522.65	519.65	532.65	No	No	No
	Thrice	415.55	460.32	461.62	No	No	No
(4g wheel powder + 1g chilli dust) litre ⁻¹ of water	Once	370.32	345.65	370.52	No	No	No
	Twice	360.58	332.32	370.59	No	No	No
	Thrice	372.00	371.58	351.58	No	No	No
(6g wheel powder + 2g chilli dust) litre ⁻¹ of water	Once	568.99	563.33	598.78	No	No	No
	Twice	544.12	545.54	545.56	No	No	No
	Thrice	490.75	470.85	470.56	No	No	No
(8g wheel powder + 2g chilli dust) litre ⁻¹ of water	Once	150.12	115.24	20.56	No	No	No
	Twice	51.23	40.56	10.88	No	No	No
	Thrice	45.58	42.36	5.87	No	No	No
(10g wheel powder + 2g chilli dust) litre ⁻¹ of water	Once	21.32	6.00	0.00	No	No	No
	Twice	5.65	0.00	0.00	No	No	No
	Thrice	2.52	0.00	0.00	No	No	0
(15 g wheel powder + 3g chilli dust) litre ⁻¹ of water	Once	4.63	0.00	0.00	No	No	No
	Twice	1.12	0.00	0.00	No	Little	Medium
	Thrice	0.98	0.00	0.00	Medium	Medium	Serious
(20g wheel powder + 3g chilli dust) litre ⁻¹ of water	Once	0.45	0.00	0.00	Serious leaf burning	Serious leaf burning	Serious leaf burning
	Twice	0.00	0.00	0.00	Serious leaf burning	Serious leaf burning	Serious leaf burning
	Thrice	0.00	0.00	0.00	Serious leaf burning	Serious leaf burning	Serious leaf burning
(25g wheel powder + 4g chilli dust) litre ⁻¹ of water	Once	0.00	0.00	0.00	Serious leaf burning	Serious leaf burning	Serious leaf burning
	Twice	0.00	0.00	0.00	Serious leaf burning	Serious leaf burning	Serious leaf burning
	Thrice	0.00	0.00	0.00	Serious leaf burning	Serious leaf burning	Serious leaf burning
(30g wheel powder + 5g chilli dust) litre ⁻¹ of water	Once	0.00	0.00	0.00	Serious leaf burning followed by immediate dropping	Serious leaf burning followed by immediate dropping	Serious leaf burning followed by immediate dropping
	Twice	0.00	0.00	0.00	Serious leaf burning followed by immediate	Serious leaf burning followed by	Serious leaf burning followed by

				dropping	immediate dropping	immediate dropping
				Serious leaf burning followed by immediate dropping	Serious leaf burning followed by immediate dropping	Serious leaf burning followed by immediate dropping
Thrice	0.00	0.00	0.00			
LSD (0.0 I) value	201.23	189.65	210.11			
Level of significance	**	**	**			

DAFS= Days after first spr¹ P<0.0 I

Combined effect of different concentrations and frequency of spraying on the control of guava white fly

Wheel powder and chilli dust spraying @ 10g litre⁻¹ of water at 4th spray (20 days after the 1st spray) was found the most effective to control the guava white fly successfully followed by 15 g litre⁻¹ at 3rd spray 10 days after 1st spray without any leaf burning (Table 3). A little leaf burning was found while spraying the wheel powder and chilli dust detergent @ 15 g litre⁻¹ of water after the 2nd spray. Spraying of the detergent @ 30 g litre⁻¹ of water was found to cause serious leaf burning followed by leaf dropping.

Sprayed with wheel powder + 5g chilli dust @ 30 g litre⁻¹ of water was also found effective in controlling white fly with serious leaf burning followed by total leaf dropping. This finding was partially agreed with Islam et al. 2003 .They reported that sprayed with detergent powder @ 40 g litre⁻¹ of water was found effective in controlling white fly with serious leaf burning followed by total leaf dropping.

CONCLUSION

The cheap and readily available wheel powder and chilli dust was found most effective to control white fly. Spraying of the wheel powder and chilli dust @ 10g litre⁻¹ of water at 3rd spray (20 after 1st spray) was found most effective to control the white fly without any burning of the guava leaves. The 2nd spray was done 5 days after the 1st spray, 3rd spray was done 10 days after the 1st spray and the 4th spray was done 20 days after the 1st spray. Spray of the wheel powder and chilli dust @ 15 g

litre⁻¹ of water was also found most effective if it was sprayed two times without any leaf burning.

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