



Short Note

Eco-friendly Management of Cassava Whitefly, *Bemisia Tabaci Gennadius*

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Field trials were conducted for the management of whitefly in the cassava variety CO2 with environment – farmer friendly botanicals during 2006-2007 and 2007-2008 at farmer's holdings of Attur Taluk, Salem District. Pooled data revealed that application of sweetflag rhizome *Acorus calamus* 10 D @ 25 kg/ha and NSKE 5% at 15 days interval recorded significant reduction in whitefly population from 7 to 1 per leaf on fifth day after treatment. This treatment recorded the lowest mosaic incidence of 9.10% with a tuber yield of 15.5 t/ha and benefit cost ratio of 2.80 compared to the untreated control which recorded 7 adults per leaf with a tuber yield of 11.92 t/ha.

Key words: Cassava, botanicals, Whitefly management

In Tamil Nadu cassava cultivation occupies an area of 1,10,00 ha. In Salem and Namakkal Districts alone a major area of 44,500 ha is under cassava cultivation. Eventhough soils of these Districts are highly productive, the pests viz., scales, cotton, whitefly, spiraling whitefly (*Aleurodicus dispeurus*) and red spider mite attack at critical stages of crop growth suppresses the yield and quality of tubers. Among the pests, whitefly a vector for cassava mosaic disease reduces the tuber yield up to 42% (Palanisamy *et al.*, 1996). Palaniswamy and Pillai (1990) conducted bio-ecological studies on the cassava whitefly. The egg, nymphal and pupal periods of the whitefly varied from 2 to 5, 11 to 16 and 4 to 10 days respectively and the total life cycle ranged from 17 to 30 days on cassava (Pillai and Daniel 1979). Nair and Daniel (1983) indicated that cassava varieties with green petiole are more preferred by whitefly than with red petiole. For the control of whitefly, systemic insecticides like dimethoate, methyl demeton and monocrotophos were already recommended (Crop Production Guide 1999). Continuous usage of insecticides may cause resistance to whitefly to that insecticide and the chances for the resurgence of any other insect may result (Regupathy *et al.* 1989). Moreover the chances for the natural enemy complex build up for the pest suppression in cassava also will not exit. Sofar a suitable eco-friendly pest management strategy for cassava whitefly was not developed and hence this study was attempted involving botanicals viz., neem oil, NSKE and sweet flag rhizome powder as an eco-friendly approach.

Materials and Methods

The field experiment was conducted for two years (2006-2007 and 2007-2008) at farmers holding of Attur taluk, Salem District of Tamil Nadu. The trial was laid out in a Randomized Block Design with eleven treatments as detailed below.

Treatment Details

- T₁ *Acorus calamus* 10D @ 25kg/ha dusting and second dusting after a fortnight
- T₂ Neem oil 2% spraying and second spray after a fortnight
- T₃ Neem seed kernel extract 5% spraying and second spray after a fortnight
- T₄ *Acorus calamus* 10D 25 kg/ha and Neem oil 2% spraying after a fortnight
- T₅ *Acorus calamus* 10D 25 kg/ha and NSKE 5% spraying after a fortnight
- T₆ Neem oil 2% and *Acorus calamus* 10D 25 kg/ha after a fortnight
- T₇ Neem oil 2% and NSKE 5% after a fortnight
- T₈ NSKE 5% and *Acorus calamus* 10D 25 kg/ha after a fortnight
- T₉ NSKE 5% and Neem oil 2% after a fortnight
- T₁₀ first spray of dimethoate 30 EC 2ml/lit of water and second spray after a fortnight
- T₁₁ Control (No spray)

The treatments were replicated thrice. The population of whitefly was assessed per leaf from

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Table 1: Effect of botanicals on whitefly and yield in cassava variety CO2 - 2006-2007, 2007-2008 and Pooled analysis

Treatments	No. of whiteflies / leaf						ICMV incidence (%) (2006-07)	Tuber yield (t/ha) 2006-07	B:C ratio 2006-07	No. of whiteflies / leaf						ICMV incidence (%) (2007-08)	tuber yield (t/ha) 07-08	B:C ratio 2007-08	No. of whiteflies / leaf						ICMV incidence (%) (Pooled)	Tuber yield (t/ha) (Pooled)	B:C ratio (Pooled)
	I spray			II spray						I spray			II spray						I spray			II spray					
	3 DAT	5 DAT	5 DAT	3 DAT	5 DAT	5 DAT				3 DAT	5 DAT	5 DAT	3 DAT	5 DAT	5 DAT				3 DAT	5 DAT	5 DAT	3 DAT	5 DAT	5 DAT			
T1	1.3	2.5	1.5	2.6	1.4	2.6	1.8	2.7	2.41	14.06	13.3	2.41	1.4	2.6	1.8	2.7	2.91	14.02	13.5	2.91	1.4	2.6	1.7	2.7	12.90	14.04	2.70
T2	1.7	3.4	1.9	3.2	1.5	3.3	1.7	3.3	2.32	13.98	14.4	2.32	1.5	3.3	1.7	3.3	2.79	13.80	13.5	2.79	1.6	3.4	1.8	3.3	14.00	13.89	2.60
T3	2.1	3.5	2.4	3.2	1.9	3.4	2.1	3.1	2.02	12.86	16.7	2.02	1.9	3.4	2.1	3.1	2.47	12.71	15.6	2.47	2.0	3.5	2.3	3.2	16.20	12.79	2.20
T4	1.6	2.4	1.6	2.4	2.0	2.5	1.5	2.2	2.21	13.34	15.9	2.21	2.0	2.5	1.5	2.2	2.72	13.42	14.3	2.72	1.8	2.5	1.6	2.3	15.10	13.38	2.50
T5	0.4	0.9	0.3	0.6	0.6	0.8	0.4	0.7	2.52	14.78	18.9	2.52	0.6	0.8	0.4	0.7	3.10	16.22	9.2	3.10	0.5	0.9	0.4	0.7	9.10	15.50	2.80
T6	2.4	3.6	2.5	3.8	1.9	3.0	2.5	3.6	2.20	13.26	16.2	2.20	1.9	3.0	2.5	3.6	2.74	13.50	15.7	2.74	2.2	3.3	2.5	3.7	16.00	13.38	2.50
T7	1.8	3.2	1.6	2.9	1.6	3.1	1.7	2.8	2.28	13.79	14.8	2.28	1.6	3.1	1.7	2.8	2.79	13.96	13.8	2.79	1.7	3.1	1.7	2.9	14.30	13.88	2.50
T8	0.9	2.0	0.9	1.9	0.8	2.0	1.0	2.0	2.32	13.62	14.2	2.32	0.8	2.0	1.0	2.0	2.90	14.26	13.2	2.90	0.9	2.0	1.0	2.0	13.70	13.94	2.60
T9	1.7	3.8	1.9	3.6	1.5	3.5	1.8	3.2	2.23	13.46	15.3	2.23	1.5	3.5	1.8	3.2	2.72	13.29	15.5	2.72	1.6	3.7	1.9	3.4	15.40	13.38	2.50
T10	0.6	0.9	0.6	0.8	0.7	0.9	0.7	0.9	2.51	14.56	13.1	2.51	0.7	0.9	0.7	0.9	3.05	14.12	12.0	3.05	0.7	0.9	0.7	0.9	12.60	14.34	2.80
T11	7.4	7.1	7.2	7.1	7.2	6.9	7.4	7.3	-	11.82	25.9	-	7.2	6.9	7.4	7.3	-	12.02	25.6	-	7.3	7.0	7.3	7.2	25.80	11.92	-
CD (p=0.05)	0.92	0.46	0.68	1.31	0.64	0.63	0.76	1.13	-	0.66	1.40	-	0.54	0.63	0.76	1.13	-	2.3	1.40	-	0.43	0.55	0.62	0.72	1.18	1.48	-

the observations made on mean of five plants per treatment per replication. Pre-treatment count on 105th day after planting was made and post treatment population count was made on 3rd and 5th day after treatment. The reduction in the whitefly population and ICMV incidence was assessed. The tuber yield was recorded and the cost benefit ratio of all the treatment worked out.

Results and Discussion

The first year trial was laid in ryot's holding at Manjini village of Attur taluk of Salem District during 2006-2007.

The results revealed that the treatment T₅ *Acorus calamus* 10 D 25 kg/ha and NSKE 5% spray after a fortnight recorded the lowest population of 1 whitefly/leaf on fifth day after treatment with a tuber yield of 14.78 t/ha with a benefit cost ratio of 2.52 when compared to untreated control with 7 whitefly/leaf and with a tuber yield of 11.82 t/ha.

The second year field trial was laid in the farmer's field at Salem in cassava cultivation CO2 cassava.

The results revealed that the treatment (T₅) viz., *Acorus calamus* 10 D 25 kg/ha and NSKE 5% spray after a fortnight recorded a significant reduction in

whitefly population from 7 to 1 per leaf with a tuber yield of 16.22 t/ha and a benefit cost ratio of 3.10 when compared to the untreated with a whitefly population of 7 per leaf and the tuber yield obtained was 12.02 t/ha.

The two years (2006-2007 and 2007-2008) trial observation pooled analysis revealed that two spray of *Acorus calamus* 10 D @ 25 kg/ha and NSKE 5% at 15 days interval recorded significant reduction in whitefly population from 7 to 1 per leaf on fifth day after treatment. This treatment recorded the lowest mosaic incidence of 9.10 % with a tuber yield of 15.5 t/ha and benefit cost ratio of 2.80 when compared to the untreated control which recorded 7 adults per leaf with a tuber yield of 11.9 t/ha (Table 1).

From the results of the two year pooled analysis it is evident that the incidence of ICMV was 9.10 in the treatment (T₅) viz., *Acorus calamus* 10D 25kg/ha and NSKE 5 % spraying after a fortnight when compared to 25.80% in the untreated. Hence utilization of botanicals have eliminated the whitefly population from 7 to/ 1 per leaf and the ICMV incidence was observed to be less than 10%. The biological product, sweetflag rhizome powder *Acorus calamus* 10D with 2% spray concentration has antifeedant, repellent contact and moult inhibitor mode of action against the cassava whitefly (Baskaran and Narayanasamy, 1995). Hence this study on eco-friendly management for eliminating whitefly and ICMV in turn provides a better net return to the cassava cultivators.

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