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Impact of certain biorational management practices against *Cylas formicarius* on sweet potato.

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Abstract

Field experiment was conducted at karaikal region with two cultivars of sweet potato tubers. The yield data with respect to total number of tubers, infested number of tubers, marketable number of tubers and tuber infestation per cent in different treatments imposed over Villupuram local (Red) and Karur local (White) cultivars against *C. formicarius* weevil. The highest number of tubers per plot was recorded in neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 60 kg ha^{-1} (201.33 numbers/plot), Karur local (White) cultivar was performed better (192.90 numbers/plot) than Villupuram local (Red) cultivar (184.36 numbers/plot). In Kilogram basis highest total tuber yield was recorded in phorate @ 1000 g a.i. ha^{-1} (10.07 kg/plot). The lowest total tuber yield in terms of weight was registered in neem oil 3 per cent foliar application (7.49 kg/plot). The highest tuber yield was recorded in phorate @ 1000 g a.i. ha^{-1} (8396 kg/ha). The lowest tuber yield was recorded in neem oil 3 per cent foliar application (6243 kg). The highest marketable tubers was recorded in acephate @ 468.75 g a.i. ha^{-1} as foliar application (125.67 numbers) while lowest marketable tuber was recorded in control (28.66 numbers). The highest marketable tubers was recorded in acephate@ 468.75 g a.i. ha^{-1} as foliar application (125.67 numbers) while lowest marketable tuber was recorded in control (28.66 numbers).

Keywords: Yield data, total tubers, infested tubers, marketable tubers, tuber infestation per cent, Different cultivars, *cylas formicarius*, sweet potato**.**

Introduction

Sweet potato is ranked seventh in world staple food production (expressed on a dry matter basis), after wheat, maize, rice, potato, barley and cassava. The average annual production in developing countries during 1990/1992 was 123, 769 (MT). It was cultivated in an area of 8928 (Ha) and the recorded average yield was 13.9 MT ha$^{-1.}$ The total production in Asia which included China was 1,15,467 MT which was cultivated in an area of 7337 ha^{-1}. The average production ha^{-1} 15.7 MT (FAO, 1995). In Tamil Nadu in the year 2001-02, 2002-03, 2003-04, 2004-05, 2005-06 sweet potato cultivated area were 1090, 814, 1039, 1397 and 1417 ha respectively. The average annual production in the year 2001-02, 2002-03, 2003-04, 2004-05, 2005-06 were 18683, 11121, 15049, 21118 and 29555 tonnes respectively (Season and Crop Report, 2005-2006). In India sweet potato was found to be damaged by nearly 13 different species of insect-pests. Among them, the sweet potato weevil *Cylas formicarius* Fab. is the most important one which causes serious damage since it is a field cum storage pest. The sweet potato weevil is widely

distributed, wherever this crop is grown and it causes considerable damage to the tubers and the matured vines. The infested tubers develop faint, black spots on them and hence they become unfit for human consumption. Severe infestation, it renders the tuber unfit even for livestock consumption. Sweet potato weevil is an universal pest and causing extensive damage. The low yield 10-15 tonnes ha^{-1} in India is attributed to damage caused by the sweet potato weevil *C. formicarius* Fab. The tuber yield could be improved by raising resistant verities and harvesting tuber at optimum stage. If the crop is left in the field for a longer period without harvest, tubers are prone to attack by the weevil (Onwueme, 1978). Nawale (1981) reported that the optimum stage of harvest with less weevil incidence in sweet potato was four months after planting. Ecological studies on the sweet potato weevil over different seasons revealed with increased infestation with increasing age of the crop (CTCRI, 1981). In India, an yield loss to the extent of 60 to 100 per cent was often noticed (Pillai and Palaniswami, 1984).

Materials and Methods

Field experiment was conducted during summer 2011 (June-November) in Pandit Jawaharlal Nehru College of Agriculture and Research Institute, Karaikal. The experiment was laid out in Factorial Randomised Block Design (FRBD) with two cultivars and ten treatments. The plot size was 4.0 x 3.0 m ($12m^2$) accommodating 120 plants. The spacing 60 x 20 cm was adopted between rows and between plants respectively. Two cultivars of sweet potato (*Ipomoea batatas*) *i.e*., Villupuram local (Red) and Karur local (White) were used for this study. Terminal stem cuttings of sweet potato were planted in field.

Stem cuttings were dipped in imidachloprid @ 22.25 g a.i. ha^{-1} and nimbecidine 0.50 per cent solution as treatments T_1 and T_2 respectively. Stem cuttings measuring about 10-15 cm were made in to a bundles and they were dipped for a minute in the above said insecticidal solution and used in treatments T_1 and T_2. These treated cuttings were kept in shade and they were partially covered with wet jute gunny for three days and then planted (Rhodes, 1959; Ingram, 1967). Three insecticides *viz.*, imidachloprid @ 22.25 g a.i. ha^{-1}, acephate @ 468.75 g a.i. ha^{-1} and neem oil 3 per cent were used for three times as foliar sprays at 30^{th}, 60^{th} and 75^{th} DAP using high volume sprayer (Hand operated Knapsack sprayer) @ 500 liters of spray fluid ha^{-1}. Three eco-friendly treatments such as mulching with paddy straw and earthing up at 30^{th} and 60^{th} DAP, application of neemcake @ 375 kg ha^{-1} with three levels of potash (K) applied in three equal split doses at 40^{th}, 60^{th} and 75^{th} DAP. The levels of potash were 45, 60 and 90 kg ha^{-1}. Fifteen kg of potash ha^{-1} was applied as basal application in all the treatments. The rest of potasic fertilizer were applied in three equal splits at 40^{th}, 60^{th} and 75^{th} DAP.

The weevil incidence on the crop *i.e.,* the extent of damage on vines at weekly intervals commencing from 30 DAP was assessed. The results obtained was not subjected to statistical analysis, since the damage recorded was lowest level. Besides the total number of plants, number of infested crowns, total weight of tubers, weight of weevil free marketable tubers, weight of weevil infested unmarketable tubers, number of weevil free marketable tubers, number of weevil infested unmarketable tubers, weevil infestation in each plot were recorded at the time of harvest.

Results and Discussion

Impact of different treatments on the tuber infestation (number basis/plot)

The yield data with respect to total number of tubers, infested number of tubers, marketable number of tubers and tuber infestation per cent in different treatments imposed over Villupuram local (Red) and Karur local (White) cultivars against *C. formicarius* weevil are furnished in Table 1; Fig. 1. The number of mean tubers per plot was ranged from 150.67 to 201.33. All the treatments were found to be significantly superior over control and all the treatments were at par except neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 90 kg ha^{-1} (170.83). The highest number of tubers per plot was recorded in neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 60 kg ha^{-1} (201.33 numbers) followed by stem cuttings dipping in imidachloprid @ 22.25 g a.i. ha^{-1} (197.33 numbers). The lowest number of tubers was recorded in control (150.67), while comparing the cultivars, Karur local (White) cultivar was performed better (192.90 numbers) than Villupuram local (Red) cultivar (184.36 numbers). In Karur local (White) cultivar, the treatments mean number was ranged from 150.00 to 229.67 numbers. The lowest number of tubers was recorded in control (150.00) and highest number of tubers was recorded in stem cuttings dipping in imidachloprid @ 22.25 g a.i. ha^{-1} (229.67) which was followed by acephate @ 468.75 g a.i. ha^{-1} as foliar application (224.67 numbers), neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up 30 and 60 DAP plus potash 60 kg ha^{-1} (205.67 numbers).

Table 1. Impact of different treatments on the tuber infestation (number basis/plot)

T. No.	Total No. of tubers yield/plot#			No. of infested tubers/plot#			No. of marketable tubers/plot#			Infestation (%)#		
	Red	White	Mean	Red	White	Mean	Red	White	Mean	Red	White	Mean
T_1	165.00^{gh}	229.67^{a}	197.33^{a}	132.33^{bc}	134.33^{b}	133.33^{b}	32.67^{j}	95.33^{cde}	64.00^{ef}	80.75^{j}	58.6^{fg}	69.67^{e}
T2	185.33^{def}	203.00^{bc}	194.20^{a}	126.33^{cd}	117.67^{ef}	122.00^{c}	59.00^{hi}	85.33^{ef}	72.20^{e}	68.3^{hi}	58.00^{efg}	63.15^{d}
T_3	216.00^{ab}	170.67^{fg}	193.33^{a}	93.33^{ij}	84.00^{k}	88.67^{g}	22.67^{b}	86.67^{def}	104.67^{bc}	43.27^{bc}	49.38^{cd}	46.32^{b}
T_4	166.00^{gh}	224.67^{a}	195.33^{a}	72.33^{lm}	67.00^{m}	69.67^{i}	93.67^{cdef}	157.67^{a}	125.67^{a}	43.50^{bc}	29.92^{a}	36.71^{a}
T_5	202.67^{bcd}	184.67^{ef}	193.67^{a}	80.00^{kl}	75.00^{l}	77.83^{h}	122.67^{b}	109.00^{bc}	115.83^{ab}	39.57^{b}	41.17^{b}	40.37^{a}
T_6	206.33^{bc}	184.33^{ef}	195.33^{a}	101.00^{hi}	92.00^{j}	96.50^{f}	105.33^{bcd}	92.33^{cdef}	98.83^{c}	48.99^{cd}	51.3^{de}	50.14^{b}
T_7	184.67^{ef}	204.00^{bc}	194.33^{a}	138.33^{bc}	147.00^{a}	142.67^{a}	46.33^{ij}	60.33^{hi}	53.33^{f}	75.25^{ij}	72.23^{i}	73.74^{e}
T_8	197.00^{cde}	205.67^{bc}	201.33^{a}	116.00^{ef}	110.00^{fg}	113.00^{d}	81.00^{efg}	95.67^{cde}	88.33^{d}	59.03^{fg}	53.59^{def}	56.31^{c}
T_9	169.33^{fg}	172.33^{fg}	170.83^{b}	107.00^{gh}	98.33^{ij}	102.67^{e}	62.33^{ghi}	74.00^{fgh}	68.16^{e}	63.19^{g}	57.08^{efg}	60.13^{cd}
T_{10}	151.33^{h}	150.00^{h}	150.67^{c}	122.00^{de}	122.00^{de}	122.00^{c}	29.33^{j}	28.00^{j}	28.66^{g}	80.63^{j}	81.33^{j}	80.98^{f}
Mean	184.36^{B}	192.9^{A}		108.87^{A}	104.80^{B}		75.5^{B}	88.43^{A}		60.24^{A}	55.26^{B}	
	SED	CD		SED	CD		SED	CD		SED	CD	
V	2.71	5.49		1.20	2.43		3.10	6.33		1.12	2.82	
T	6.06	12.27		2.68	5.44		6.93	14.17		2.52	5.11	

Mean of three replications; Values with same alphabet are statistically equal at P=0.05.

Treatments

T_1- Stem cuttings dipping in imidachloprid @ 22.25 g a.i. ha^{-1}

T_2- Stem cuttings dipping in nimbecidine 0.50 per cent solution

T_3- Foliar spray imidachloprid @ 22.25 g a.i. ha^{-1}

T_4- Acephate foliar spray @ 468.75 g.i. ha^{-1}

T_5- Neem oil 3 per cent foliar spray

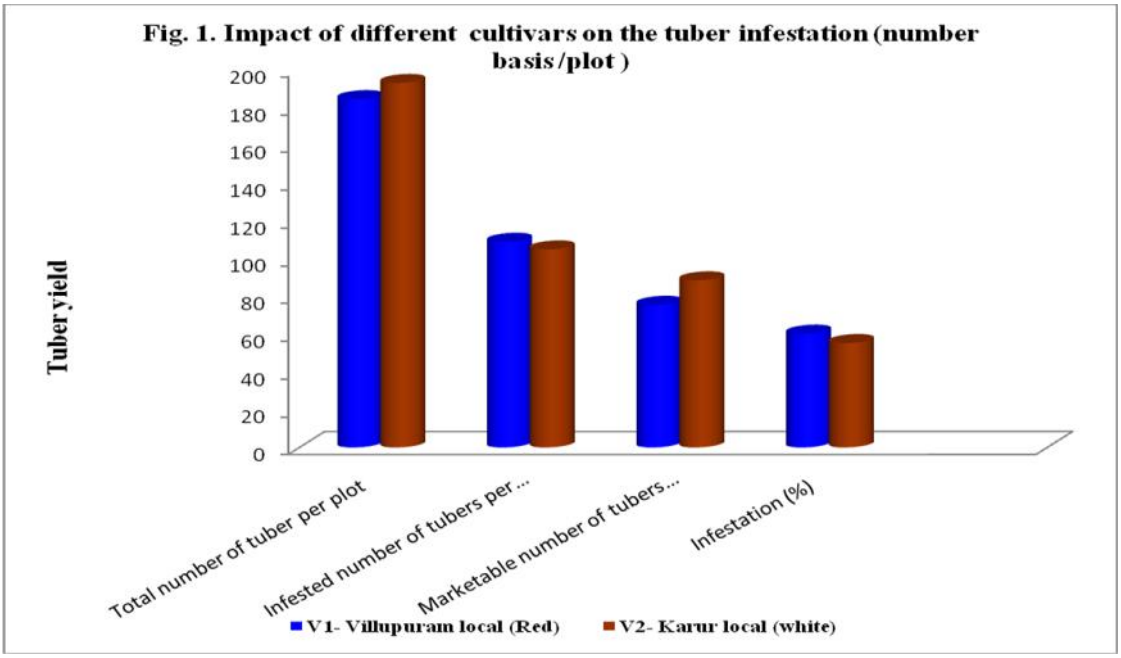
T_6- Phorate @ 1000 g a.i. ha^{-1}

T_7- Neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 45 kg ha^{-1}

T_8- Neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 60 kg ha^{-1}

T_9- Neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 90 kg ha^{-1}

T_{10}- Control.



Mean infested tubers in treatments was ranged from 69.67 to 142.67 numbers. The lowest number of infested tuber was recorded in acephate @ 468.75 g a.i. ha^{-1} as foliar application (69.67 numbers) preceded by neem oil 3 per cent foliar application (77.83 numbers), imidachloprid @ 22.25 g a.i. ha^{-1} foliar application (88.67 numbers) and highest number of infested tubers was recorded in neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 45 kg ha^{-1} (142.67 numbers). On comparison, the cultivar Karur local (White) was performed better (104.80 numbers) than the cultivar Villupuram local (Red) (108.87 numbers) by the way of number of infested tubers.

In Karur local (White) cultivar the lowest number of infested tuber was recorded in acephate @ 468.75 g a.i. ha^{-1} as foliar application (67.00) while the highest number was recorded in neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 45 kg ha^{-1} (147.00 numbers). The mean marketable tubers in different treatments was ranged from 28.66 to 125.67 numbers. The highest marketable tubers was recorded in acephate @ 468.75 g a.i. ha^{-1} as foliar application (125.67 numbers) while lowest marketable tuber was recorded in control (28.66 numbers), while comparing both cultivars, Karur local (White) cultivar was performed better (88.43 numbers) than Villupuram local (Red) cultivar (75.50 numbers). The mean infestation of tuber was ranged from 36.71 to 80.98 per cent.

The highest infestation per cent was recorded in control (80.98) and the lowest infested per cent tuber was recorded in acephate @ 468.75 g a.i. ha^{-1} as foliar application (36.71). When comparing the cultivars, the Karur local (White) was performed better (55.26%) than Villupuram local (Red) cultivar (60.24%) by the way of per cent infestation**.**

Impact of different treatments on the tuber infestation (weight basis/plot)

The yield data on weight basis per plot with respect to total tubers, infested tubers, marketable tubers and per cent tuber infestation in different treatments imposed over red and white cultivars against *C. formicarius* weevil are furnished in Table 2; Fig. 3. The total mean tuber yield was ranged from 7.49 to 10.07 kg per plot. Highest total tuber yield was recorded in phorate @ 1000 g a.i. ha^{-1} (10.07 kg) followed by neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 45 kg ha^{-1} (9.80 kg), stem cuttings dipping in nimbecidine 0.50 per cent solution (9.75 kg). The lowest total tuber yield in terms of weight was registered in neem oil 3 per cent foliar application (7.49 kg) preceded by imidachloprid @ 22.25 g a.i. ha^{-1} foliar application (8.75 kg) and acephate @ 468.75 g a.i. ha^{-1} as foliar application (8.28 kg). Among the two cultivars tested, the Villupuram local (Red) cultivar was performed better (9.63 kg) than Karur local (White) cultivar (8.68 kg) by the way of highest tuber yield. The mean weight infested tubers per plot was ranged from 2.78 to 8.11 kg.

Table 2. Impact of different treatments on the tuber infestation (weight basis/plot)

Treatments No.	Total tuber yield/plot# (kg)			Infested tuber/plot# (kg)			Marketable tuber yield/plot# (kg)			Infestation (%)#		
	Red	White	Mean	Red	White	Mean	Red	White	Mean	Red	White	Mean
T_1	9.20^{bcd}	9.73^{bc}	9.46^{ab}	5.90	6.13	6.02^{b}	3.30^{c}	3.60^{c}	3.45^{d}	64.16^{e}	63.07^{e}	63.61^{d}
T2	9.21^{bcd}	10.3^{ab}	9.75^{ab}	5.78	5.90	5.84^{b}	3.43^{c}	4.33^{c}	3.88^{cd}	63.20^{e}	58.19^{cde}	60.91^{d}
T_3	9.85^{bc}	7.67^{d}	8.75^{bc}	3.46	4.10	3.78^{c}	6.38^{ab}	3.60^{c}	4.99^{ab}	35.11^{a}	53.64^{bcd}	44.37^{b}
T_4	10.20^{abc}	6.36^{e}	8.28^{cd}	2.70	2.87	2.78^{d}	7.50^{a}	3.50^{c}	5.50^{a}	26.41^{a}	45.68^{b}	36.04^{a}
T_5	8.85^{bcd}	6.13^{e}	7.49^{d}	2.91	3.03	2.98^{d}	5.93^{b}	3.10^{c}	4.51^{bc}	33.48^{a}	50.01^{bc}	41.74^{ab}
T_6	11.51^{a}	8.63^{cd}	10.07^{a}	5.58	5.50	5.54^{b}	5.93^{b}	3.13^{c}	4.53^{abc}	48.61^{b}	63.65^{e}	56.13^{c}
T_7	9.63^{bc}	9.97^{abc}	9.80^{ab}	6.06	6.10	6.08^{b}	3.57^{c}	3.87^{c}	3.71^{cd}	63.84^{e}	61.45^{de}	62.65^{d}
T_8	9.40^{bc}	9.30^{bcd}	9.35^{abc}	5.73	5.77	5.76^{b}	3.62^{c}	3.53^{c}	3.60^{cd}	61.53^{e}	62.51^{de}	62.02^{cd}
T_9	8.63^{cd}	9.33^{bc}	8.98^{abc}	5.67	5.67	5.67^{b}	2.97^{c}	3.67^{c}	3.31^{d}	65.94^{e}	60.71^{de}	63.32^{d}
T_{10}	9.83^{bc}	9.37^{bc}	9.60^{ab}	8.33	7.90	8.11^{a}	1.50^{d}	1.47^{d}	1.48^{e}	84.58^{f}	84.40^{f}	84.49^{e}
Mean	9.63^{A}	8.68^{B}		5.21	5.29		4.41^{A}	3.38^{B}		54.69^{A}	60.33^{B}	
	SED	CD		SED	CD		SED	CD		SED	CD	
V	0.25	0.52		0.134	NS		0.21	0.43		1.39	2.82	
T	0.57	1.16		0.301	0.61		0.47	0.96		3.11	6.31	

Mean of three replications; Values with same alphabet are statistically equal at P=0.05.

Treatments

T_1- Stem cuttings dipping in imidachloprid @ 22.25 g a.i. ha^{-1}

T_2- Stem cuttings dipping in nimbecidine 0.50 per cent solution

T_3- Foliar spray imidachloprid @ 22.25 g a.i. ha^{-1}

T_4- Acephate foliar spray @ 468.75 g.i. ha^{-1}

T_5- Neem oil 3 per cent foliar spray

T_6- Phorate @ 1000 g a.i. ha^{-1}

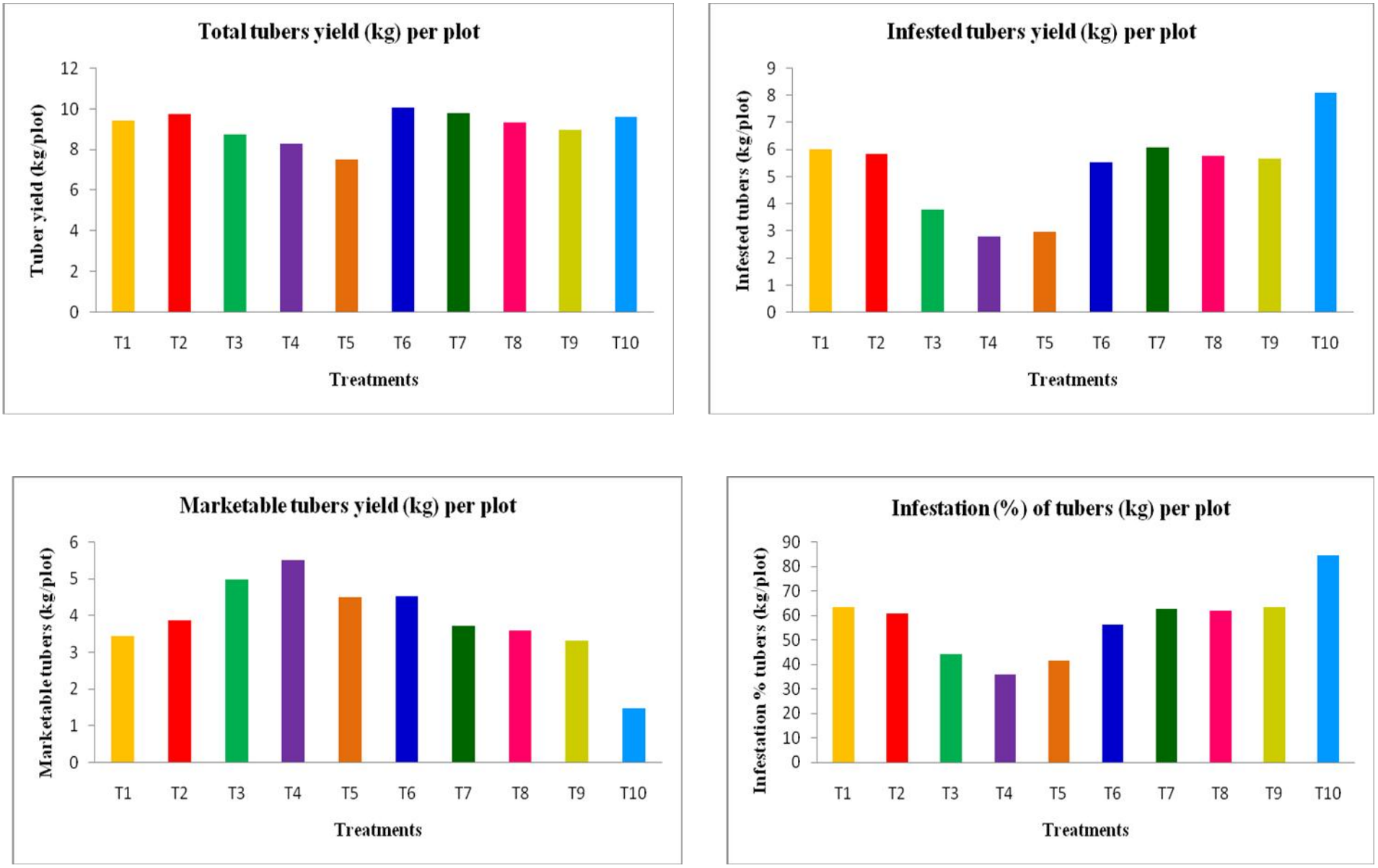
T_7- Neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 45 kg ha^{-1}

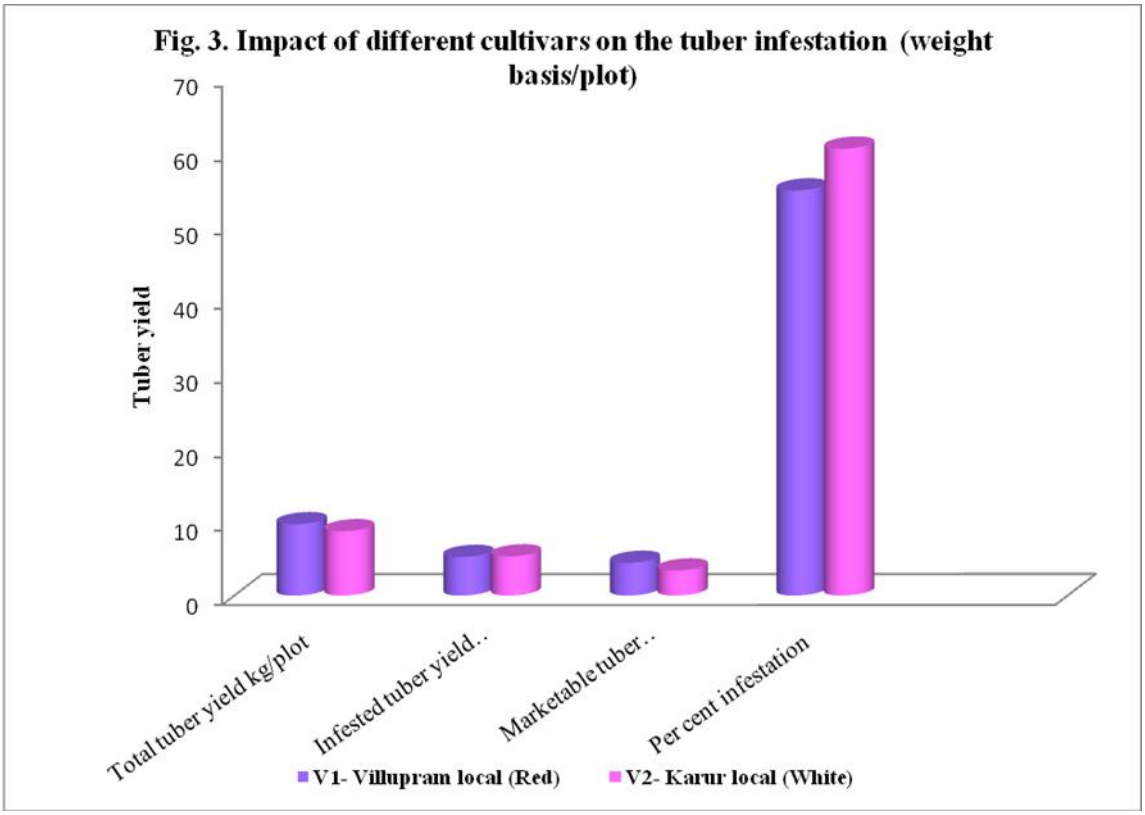
T_8- Neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 60 kg ha^{-1}

T_9- Neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 90 kg ha^{-1}

T_{10}- Control.

Fig. 2. Impact of different treatments on the tuber infestation (weight basis per plot)





The highest infested tubers per plot was recorded in control (8.11 kg) followed by neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 45 kg ha^{-1} (6.08 kg), stem cuttings dipping in imidachloprid @ 22.25 g a.i. ha^{-1} (6.02 kg). The lowest infested tuber per plot was recorded in acephate @ 468.75 g a.i. ha^{-1} as foliar application (2.78 kg) preceded by neem oil 3 per cent foliar application (2.98 kg), imidachloprid @ 22.25 g a.i. ha^{-1} foliar application (3.78 kg). Among the two varieties the Villupuram local (Red) cultivar was performed better (5.21 kg) than Karur local (White) cultivar (5.29 kg). There was no significant difference on the interaction effect of cultivars and treatments.

The marketable tuber mean yield ranged from 1.48 to 5.50 kg. The lowest tuber yield per plot was recorded in control (1.48 kg) preceded by neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 90 kg ha^{-1} (3.31 kg) and stem cuttings dipping in imidachloprid @ 22.25 g a.i. ha^{-1} (3.45 kg). Highest marketable tuber yield per plot was recorded in acephate @ 468.75 g a.i. ha^{-1} as foliar application (5.50 kg) followed by imidachloprid @ 22.25 g a.i. ha^{-1} foliar application (4.99 kg), phorate @ 1000 g a.i. ha^{-1} (4.53 kg). While comparing the two cultivars the Villupuram local (Red) cultivar was performed better (4.41 kg) than Karur local (White) cultivar (3.38 kg) (Fig. 2).

The mean per cent infestation was ranged from 36.04 to 84.49. The lowest mean per cent infestation was recorded in acephate @ 468.75 g a.i. ha^{-1} as foliar application (36.04%) preceded by neem oil 3 per cent foliar application (41.74%) and imidachloprid @ 22.25 g a.i. ha^{-1} foliar application (44.37%). Highest per cent infestation was recorded in control (84.49%) followed by stem cuttings dipping in imidachloprid @ 22.25 g a.i. ha^{-1} (63.61%), neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 90 kg ha^{-1} (63.32%).

Impact of different treatments on the tuber infestation (weight basis in kg/hectare)

The yield data on the basis of kg per hectare was worked out with respect to total tubers, infested tubers, marketable tubers and per cent tuber infestation in different treatments imposed over Villupuram local (Red) and Karur local (White) cultivars against *C. formicarius* weevil are furnished in Table 3; Fig. 5. The yield of total tuber in treatments kg ha^{-1} in respect of different treatments was ranged from 6243 to 8396. The highest tuber yield was recorded in phorate @ 1000 g a.i. ha^{-1} (8396 kg) followed by neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 45 kg ha^{-1} (8167 kg), stem cuttings dipping in nimbecidine 0.50 per cent solution (8132 kg).

Table 3. Impact of different treatments on the tuber infestation (weight basis kg/hectare)

Treatments No.	Total tuber yield# (kg/ha)			Weevil infested tuber yield# (kg/ha)			Marketable tuber yield# (kg/ha)			Infestation (%)#		
	Red	White	Mean	Red	White	Mean	Red	White	Mean	Red	White	Mean
T_1	7667^{bcd}	8111^{bc}	7889^{ab}	4917	5111	5014^{b}	2750^{c}	3000^{c}	2875^{d}	64.18^{e}	63.07^{e}	63.62^{d}
T_2	7681^{bcd}	8583^{ab}	8132^{ab}	4820	4917	4868^{b}	2861^{c}	3611^{c}	3236^{cd}	63.13^{e}	58.19^{cde}	60.66^{d}
T_3	8208^{bc}	6387^{de}	7299^{bc}	2887	3417	3153^{c}	5319^{ab}	3000^{c}	4160^{ab}	35.17^{a}	53.64^{bcd}	44.40^{b}
T_4	8500^{abc}	5306^{e}	6903^{cd}	2250	2389	2320^{d}	6260^{a}	2917^{c}	4583^{a}	26.41^{a}	45.68^{b}	36.05^{a}
T_5	7375^{bcd}	5111^{e}	6243^{d}	2430	2528	2479^{d}	4945^{b}	2583^{c}	3764^{bc}	33.37^{a}	50.01^{bc}	41.69^{ab}
T_6	9597^{a}	7195^{cd}	8396^{a}	4653	4583	4618^{b}	4945^{b}	2611^{c}	3978^{abc}	48.39^{b}	63.65^{e}	56.01^{c}
T_7	8028^{bc}	8306^{abc}	8167^{ab}	5056	5083	5069^{b}	2972^{c}	3222^{c}	3097^{cd}	63.85^{e}	61.45^{de}	62.64^{d}
T_8	7833^{bc}	7750^{bcd}	7792^{abc}	4778	4806	4792^{b}	3056^{c}	2944^{c}	3000^{cd}	61.53^{e}	62.51^{de}	62.02^{cd}
T_9	7194^{cd}	7798^{bc}	7486^{abc}	4722	4722	4722^{b}	2472^{c}	3056^{c}	2764^{d}	65.83^{e}	61.47^{de}	63.65^{d}
T_{10}	8195^{bc}	7806^{bc}	8000^{ab}	6945	6583	6764^{a}	1250^{d}	1222^{d}	1236^{e}	84.58^{f}	84.40^{f}	84.45^{e}
Mean	8028^{A}	7233^{B}		4346	4414		3682^{A}	2817^{B}		54.64^{A}	60.41^{B}	
	SED	CD		SED	CD		SED	CD		SED	CD	
V	214	433		112	NS		178	361		1.41	2.85	
T	478	967		251	509		398	806		3.15	6.38	

Mean of three replications; Values with same alphabet are statistically equal at P=0.05.

Treatments

T_1- Stem cuttings dipping in imidachloprid @ 22.25 g a.i. ha^{-1}

T_2- Stem cuttings dipping in nimbecidine 0.50 per cent solution

T_3- Foliar spray imidachloprid @ 22.25 g a.i. ha^{-1}

T_4- Acephate foliar spray @ 468.75 g.i. ha^{-1}

T_5- Neem oil 3 per cent foliar spray

T_6- Phorate @ 1000 g a.i. ha^{-1}

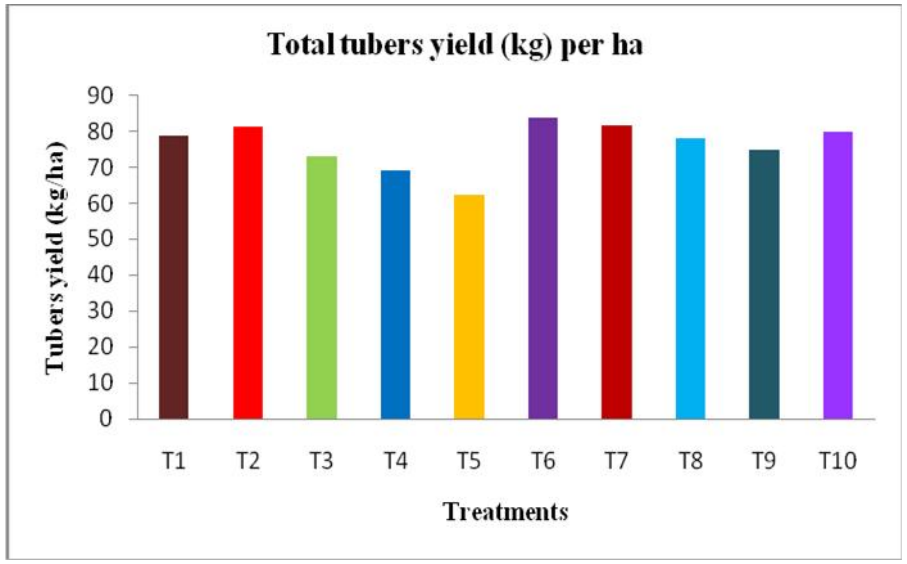
T_7- Neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 45 kg ha^{-1}

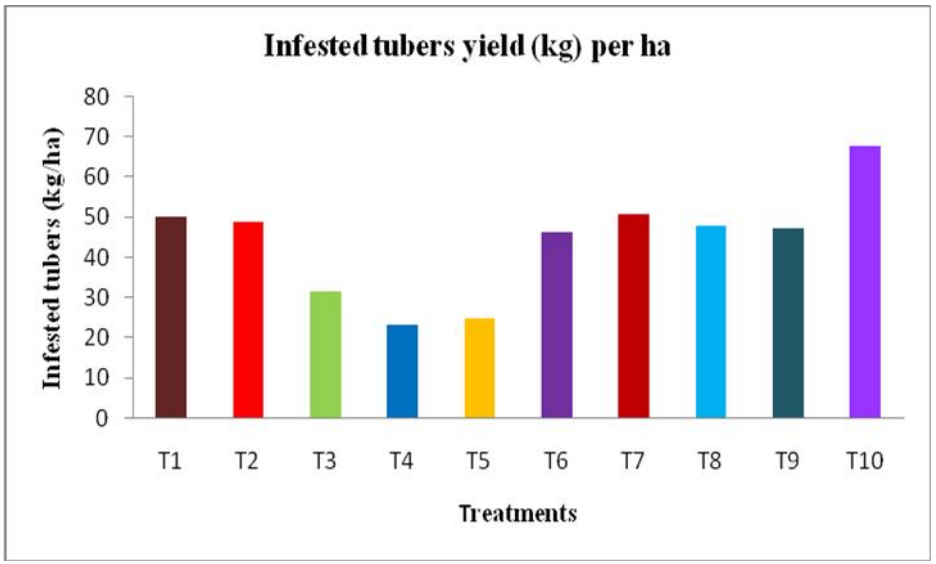
T_8- Neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 60 kg ha^{-1}

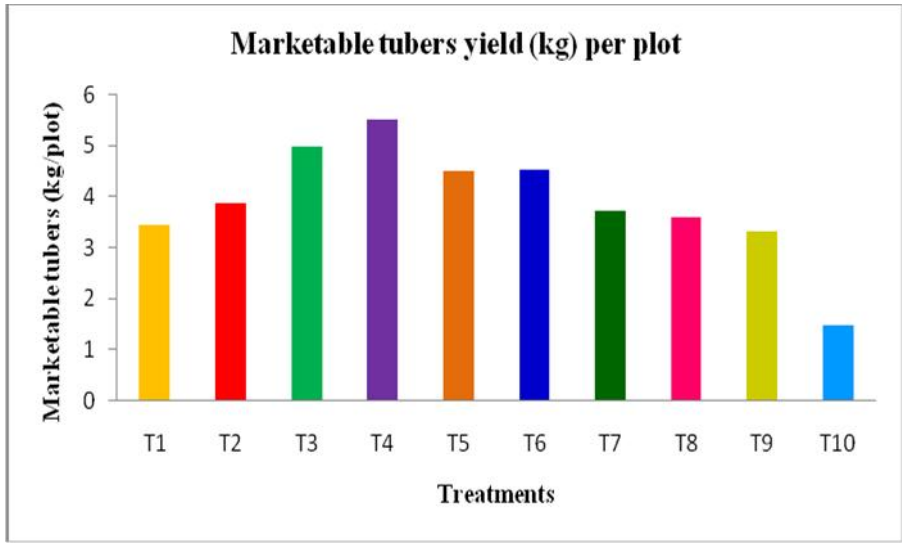
T_9- Neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 90 kg ha^{-1}

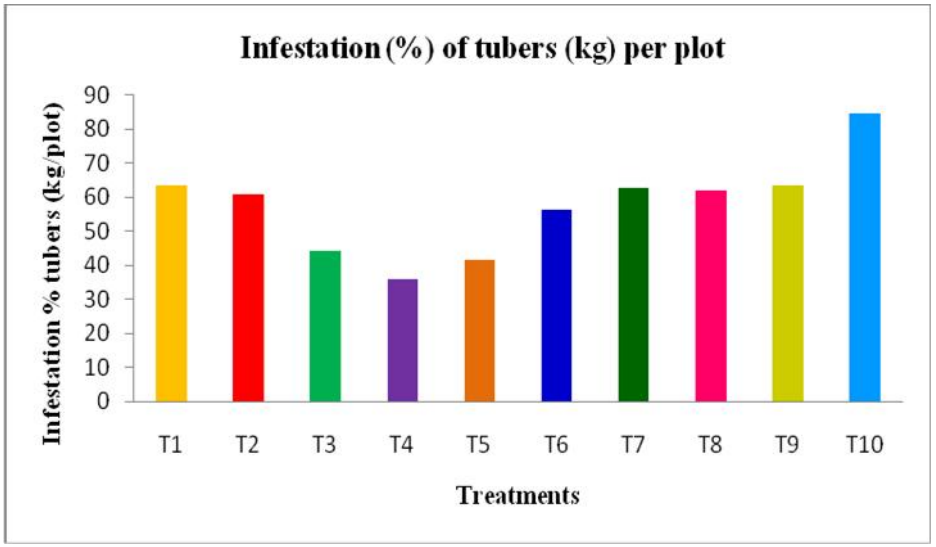
T_{10}- Control.

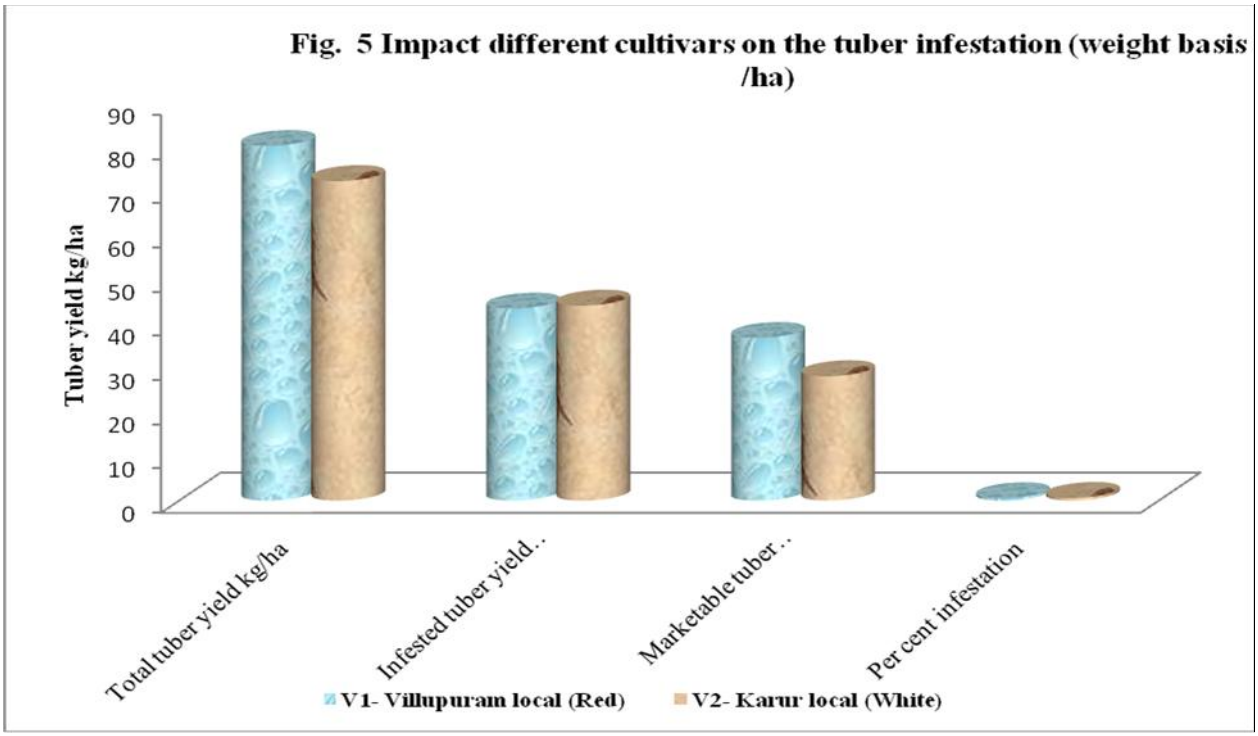
Fig. 4. Impact of different treatments on tuber infestation (weight basis per ha)











The lowest tuber yield was recorded in neem oil 3 per cent foliar application (6243 kg) followed by acephate @ 468.75 g a.i. ha^{-1} as foliar application (6903 kg) and imidachloprid @ 22.25 g a.i. ha^{-1} foliar application (7299 kg). While comparing the cultivars, the Villupuram local (Red) cultivar was performed better (8028 kg) than Karur lcoal (White) cultivar (7233 kg).

Infested mean tuber in treatments was ranged from 2320 to 6764 kg ha^{-1}. The highest infested tuber was recorded in control (6764 kg) followed by neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 45 kg ha^{-1} (5069 kg), stem cuttings dipping in imidachloprid @ 22.25 g a.i. ha^{-1} (5014 kg). The lowest infested tuber was recorded in acephate @ 468.75 g a.i. ha^{-1} as foliar application (2320 kg) preceded by neem oil 3 per cent foliar application (2479 kg) and imidachloprid @ 22.25 g a.i. ha^{-1} foliar application (3153 kg).

Marketable tuber mean yield was ranged from 1236 to 4583 kg ha^{-1}. The highest marketable tuber was recorded in acephate @ 468.75 g a.i. ha^{-1} as foliar application (4583 kg) followed by imidachloprid @ 22.25 g a.i. ha^{-1} foliar application (4160 kg) and phorate @ 1000 g a.i. ha^{-1} (3978 kg). The lowest marketable tuber was recorded in control (1236 kg) preceded by neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 90 kg ha^{-1} (2764 kg) and stem cuttings dipping in imidachloprid @ 22.25 g a.i. ha^{-1} (2875 kg). Among two cultivars, the Villupuram local (Red) cultivar was recorded as better performed cultivar (3682 kg) followed by Karur local (White) cultivar (2817 kg). The mean of per cent infestation was ranged from 36.05 to 84.45. The lowest per cent of infestation was recorded in acephate @ 468.75 g a.i. ha^{-1} as foliar application (36.05%) preceded by neem oil 3 per cent foliar application (41.69%) and imidachloprid @ 22.25 g a.i. ha^{-1} foliar application (44.40%). Highest per cent infestation was recorded in control (84.45%) followed by neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 90 kg ha^{-1} (63.65%). All the treatments were found to be significantly superior over control. (Fig. 4)

The highest infestation per cent was recorded in control (84.58%) followed by neemcake 375 kg ha^{-1} plus mulching with paddy straw and earthing up at 30 and 60 DAP plus potash 90 kg ha^{-1} (65.83%) and stem cuttings dipping in imidachloprid @ 22.25 g a.i. ha^{-1} (64.18%). In Karur local (White) cultivar, the infestation was ranged from 45.68 to 84.40 per cent. The lowest infestation per cent was recorded in acephate @ 468.75 g a.i. ha^{-1} as foliar application (45.68%) preceded by neem oil 3 per cent foliar application (50.01%) and imidachloprid @ 22.25 g a.i. ha^{-1} foliar application (53.64%) per cent. The highest infestation per cent was recorded in control (84.40%) followed by phorate @ 1000 g a.i. ha^{-1} (63.65%) and stem cuttings dipping in imidachloprid @ 22.25 g a.i. ha^{-1} (63.07%).

At 30 DAP the Villupuram local (Red) cultivar was recorded with lowest number of insects population as 5.77 and 18.70 on first and 14th DAS respectively, whereas at 60 DAP Villupuram local (Red) cultivar was recorded with 10.70 and 13.03 number of insects on first and seventh DAS respectively, which were the lowest. At 75 DAP the lowest number 10.70 of insects population was registered in Villupuram local (Red) cultivar when compared with Karur local (White) cultivar. The result obtained is not in accordance with the reports of Trehan and Bagal (1957) who have reported that the white variety was recorded with less infestation. However Singh *et al.*, (1981) reported that the cultivars did not posses any differential preference for colour, for the feeding or oviposition. The reason for the contradiction would be due to environmental condition and the influence of treatments imposed over it. No significant difference was observed among the cultivars on seventh, 21st and 28th DAS at 30 DAP. There was no cultivar difference was observed on 14th, 21st and 28th DAS at 60 DAP. No varietal influence was observed in respect of seven, 14th, 21st and 28th DAS and the Villupuram local (Red) cultivar was reported with less weevil population than the Karur local (White) cultivar.

References

FAO, 1995. Potatoes in the 1990s: Current Status and Future Prospects of the World Potato Industry (In press).

Season and Crop Report, 2005-06. Department of Economics and Statistics, Government of Tamil Nadu.

Onwueme, J. C. (1978). Sweet potato. The Tropical Tuber Crops, 165-195.

Nawale, R. N. 1981. A study on the stage of harvest in sweet potato variety, H. 268 under Konkan (Maharashtra) conditions. **J. Root Crops, 7**: 29-31.

CTCRI, 1981. Package of practices-Recommendations. Kerala Agril. University, Trichur.

Pillai, K. S. and M. S. Palaniswami, 1984. Pests of tuber crops. **Indian Forming, 33** (12): 58-66.

Rhodes, P. L. 1959. The control of sweet potato weevil. **Agric. J. Fiji., 29**: 142-145.

Ingram, W. R. 1967. Chemical control of sweet potato weevil in Uganda. **E. Afr. Agric. J.,** pp. 163-165.

Trehan, K.N. and S.R. Bagal. 1957. Life-history, Bionomics and control of sweet potato weevil *Cylas formicarius* F. with short notes on some other pests of sweet potato in Bombay state. **Indian J. Ent., 19** (4) ; 245-252.

Singh, B., S. S. Yazdani, R. Singh, and S. F. Hameed. 1981. Effect of intercropping on the incidence of sweet-potato weevil, *C. formicarius* Fabr. in sweet potato (*Ipomea babatas* Lam). **Journal of Entomological Research, 5:** 123-125.

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