

Tea Purple Mite
Section VIII
Mites & Sap-Sucking Pests

EFFICACY OF NEEM FORMULATIONS AGAINST PINK MITE, *ACAPHYLLA THEA* WATT INFESTING TEA IN INDIA.

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The perennial tea (*Camellia sinensis* L.) plantation is affected by an array of pests round the year. Among them the pink mite, *Acaphylla thea* (Watt) causes damage to the leaves thereby reducing the briskness and flavor of the tea. Chemical control continues to play a vital role in reducing the damage caused by *A. thea*. In an attempt to scale down the ill effects caused by chemical pesticides to this beverage crop and to facilitate production of organic tea, the neem formulations viz., TNAU neem 0.03 EC (containing 0.03% azadirachtin, developed by Tamil Nadu Agricultural University) and Neem Gold 0.15 EC (containing 0.15% azadirachtin from Southern Petrochemical Industries (SPIC), Chennai, India) were evaluated for managing the pest. Neem oil, neem seed kernel extract (NSKE) and Ethion 50 EC were included as standard checks.

In the laboratory, the toxicity of neem formulations to *A. thea* adults was evaluated by leaf disc assay with five replications @ 20 adult mites per leaf disc. Mortality of the mites was recorded 1, 2 and 3 days after treatment (DAT). Deterrence of neem formulations to tea mite was evaluated by dual choice test treating one half of the disc while the other untreated half served as check. Batches of twenty adult mites were placed at the centre of each disc and the orientation of mites towards treated or the control area was recorded 24 hours after. Five replicates were maintained per treatment.

Field experimental plots were established in the tea plantation at Coonoor, The Nilgiris (1600m above MSL), Tamil Nadu. with three replications; 100 bushes constituting one plot. Two rounds of application were given at 30 days interval. The population of the mites was counted on 50 leaves collected at random.

Azadirachtin residues in fresh tea leaf were extracted in methanol and partitioned into hexane. The residues in mother liquor were extracted into dichloromethane layer. Final determination was done using HPLC after dissolving 10 ml HPLC grade methanol.

Survival rate of the *A. thea* adults in all the treatments tended to decrease with lapse of time after application. Ethion and NSKE caused the highest mortality of *A. thea* (100%) 3DAT. Neem Gold @ 0.2, 0.5 and TNAU neem @ 0.3 % caused more than 90 per cent mortality (Table 1). In the choice test neem formulations strongly prevented the orientation of *A. thea* to the treated surface. The per cent alightment of *A. thea* ranged from 30.0 – 42.0 per cent (Fig. 1).

The field population was reduced to a maximum level of 28.8- 38.5 per cent ,7 days after first application. The maximum per cent reduction due to neem formulations was 36.9 – 72.2 per cent 15 days after second application. (Table 2).

No phytotoxic symptoms were observed on tea bushes treated with the neem formulations. The residues of Neem Gold 0.15 EC and TNAU neem 0.03 EC were below detectable limit in made tea samples taken one day after treatment. Though the synthetic insecticide Ethion is more effective than neem formulations, considering the toxicity to non target organisms, residues and resistance development associated with it, the neem formulation is the best bet in the IPM schedule for the purple mite.

Table 1. Acute toxicity of neem formulations to *Acapylla thea* on tea.

Treatments	Concentration (%)	Per cent mortality after * (hrs)		
		24	48	72
T1 Neem gold 0.15 EC	0.02	35.20 (36.1) ^b	41.80 (40.20) ^a	90.00 (73.30) ^b
T2 Neem gold 0.15 EC	0.05	41.6 (40.1) ^{bc}	62.40 (52.30) ^a	91.00 (72.90) ^{ab}
T3 Neem gold 0.15 EC	0.1	48.6 (44.2) ^c	93.30 (82.20) ^b	100.00 (90.00) ^c
T4 TNAU neem 0.03EC	0.1	24.6 (29.20) ^a	46.40 (42.90) ^a	83.00 (65.80) ^a
T5 TNAU neem 0.03EC	0.3	43.6 (41.30) ^{bc}	96.50 (82.70) ^b	99.00 (86.60) ^c
T6 Neem oil 3 %	3.0	21.7 (27.60) ^a	76.20 (61.90) ^{ab}	92.00 (75.30) ^b
T7 NSKE 5%	5.0	38.40 (38.20) ^{bc}	93.30 (80.30) ^b	100.00 (90.00) ^{ob}
T8 Ethion 50 EC	.05	67.80 (55.40) ^a	100.00 (90.00) ^c	100.00 (90.00) ^c

* Mean of four replications;

Means followed by same letter in a column are not significantly different by (p=0.05) DMRT

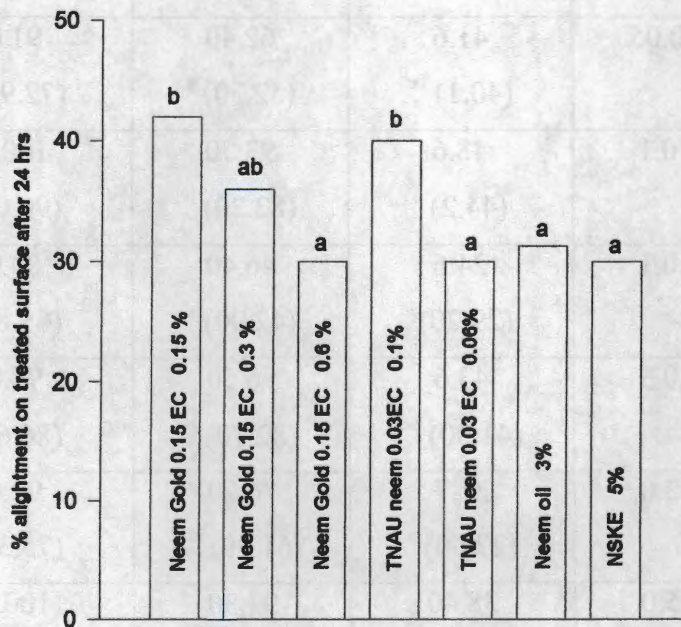


Fig .1. Deterrence of neem formulations to *A. thea*
 Means followed by same letter in a column are not significantly different by
 ($p=0.05$) DMRT

Table -3 . Bio efficacy of neem formulations applied against pink mite, *A. thea*

Treatments	Dose ml/ha.	Pre treatment count *	Corrected per cent mortality				Pre treatment count *	Corrected per cent mortality			
			1 DAIT	3 DAIT	7 DAIT	15 DAIT		1 DAIIT	3 DAIIT	7 DAIIT	15 DAIIT
T1 Neem gold 0.15 EC	625	100.5	9.30 (17.60) ^a	15.80 (23.30) ^a	28.80 (32.40) ^a	27.80 (31.70) ^a	83.20	94.0 (17.80) ^a	15.70 (23.30) ^a	26.30 (30.70) ^a	36.90 (37.30) ^a
T2 Neem gold 0.15 EC	1250	99.70	10.80 (19.10) ^a	20.50 (26.90) ^{ab}	34.70 (36.0) ^{ab}	33.30 (35.20) ^{ab}	76.50	14.80 (22.30) ^{ab}	25.70 (30.20) ^b	40.80 (39.60) ^{bc}	50.80 (45.50) ^b
T3 Neem gold 0.15 EC	2500	100.50	15.60 (23.20) ^{bc}	23.80 (29.10) ^{bc}	38.50 (38.30) ^b	36.60 (37.20) ^b	74.50	19.10 (25.70) ^b	33.30 (35.10) ^b	52.00 (46.20) ^d	72.20 (58.50) ^c
T4 TNAU neem 0.03EC	250	105.20	10.00 (18.20) ^a	15.0 (22.50) ^a	29.90 (33.0) ^{ab}	27.60 (31.60) ^a	89.20	16.0 (23.40) ^{ab}	26.00 (30.50) ^b	30.50 (33.50) ^{ab}	46.70 (43.10) ^{ab}
T5 TNAU neem 0.03EC	500	106.7	13.40 (21.30) ^{ab}	23.0 (28.60) ^{bc}	37.30 (37.60) ^{ab}	36.00 (36.80) ^b	78.50	17.30 (24.60) ^b	32.30 (34.60) ^b	49.30 (44.60) ^{cd}	62.90 (52.50) ^c
T6 Ethion 50 EC	500	95.70	19.30 (25.90) ^c	30.30 (33.20) ^c	47.50 (43.50) ^c	47.10 (43.30) ^c	58.0	27.20 (31.20) ^c	43.50 (41.20) ^c	68.60 (56.00) ^c	84.0 (66.50) ^d
T7 Control *		104.5	109.5	111.5	116.7	119.7	119.70	121.2	121.5	122.0	126.5

DAIT – Days after Ist treatment, DAIIT – Days after II treatment; * Number of mites per 50 leaves

Means followed by same letter in a column are not significantly different by (p=0.05)

DMRT