Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
www.entomoljournal.com
JEZS 2020; 8(1): 1083-1088

Received: 15-11-2019
Accepted: 18-12-2019

Sohanur Rahman
Department of Entomology, Bangladesh Jute Research Institute, Manik Mia Avenue, Dhaka, Bangladesh

Sahin Polan
Department of Entomology, Bangladesh Jute Research Institute, Manik Mia Avenue, Dhaka, Bangladesh

Nazrul Islam
Department of Entomology, Bangladesh Jute Research Institute, Manik Mia Avenue, Dhaka, Bangladesh

Arifur Rahman
Department of Agricultural Chemistry, Bangladesh Agricultural University, Mymensingh, Bangladesh

Corresponding Author:
Sohanur Rahman
Department of Entomology, Bangladesh Jute Research Institute, Manik Mia Avenue, Dhaka, Bangladesh

Effect of acaricides on yellow mite, *Polyphagotarsonemus latus* infestation in jute and its response to fibre yield

Sohanur Rahman, Sahin Polan, Nazrul Islam and Arifur Rahman

Abstract
The experiment was carried out at Entomology department, Bangladesh Jute Research Institute (BJRI), Dhaka, Bangladesh for dose fixation and in the field of two different locations *viz*. Jute Agriculture Experimental Station (JAES), Manikganj and Jute Research Sub-Station, Tarabo, Narayanganj were selected for evaluation of nine acaricides against jute yellow mite during the jute growing season (April-August) 2018 & 2019 following Randomized Complete Block Design (RCBD) with three replications. Revenge 1.8EC(Abamectin 1.8%), Power Prid 95SP (Cartap 92% + Acetamiprid 3%), Lock 12SC(Chlorphenpyr 10%+ Emamectin Benzoate 2%), Parker 75 WG (Acetamiprid 50% + Buprofezin 25%), Brinka 24 SC (Spirodiclofen 24%), Guardian 40WDG(Emamectin Benzoate 20% + Thiamethoxam 20%), Aceto 40WDG(Acetamiprid 40%), Flame38WDG(Abamectin 2%+ Imidacloprid 36%), Aim Zox 10EC(Hexythiazox 10%EC) @ 600ml/ha, 600ml/ha, 600ml/ha, 600ml/ha, 500ml/ha, 600ml/ha, 600ml/ha, 600ml/ha, 225gm/ha, 600ml/ha, 600ml/ha, 500ml/ha, 280ml/ha and 30gm/ha respectively respectively were found effective and economic in the pot experiment for controlling jute yellow mite at 3th day after spray. Among these insecticides, the highest percent reduction of jute yellow mite in 2018 (97.12%) as well as more yield (3.17 ton/ha) over control was found in plot treated with Revenge 1.8EC (Abamectin 1.8%) in Manikganj. In 2019, the highest percent reduction of jute yellow mite (96.45%) was found in plot treated with Lock 12SC (Chlorphenpyr 10%+ Emamectin Benzoate 2%) and highest in Manikganj and highest yield (3.20ton/ha) was found in Aim Zox 10EC (Hexythiazox 10%EC) treated plot in narayanganj. Overall, All tested insecticides were found effective significantly giving more than 88% reduction of infestation and more than 2.45 ton/ha fibre yields at both field experiments at two years.

Keywords: Jute, yellow mite, acaricides and infestation

Introduction
Jute is an important renewable natural fibre crop next to cotton [9]. Among the natural fibre crops, jute is the most important bast fibre crop [17]. It is mainly cultivated in India, Bangladesh, China, Nepal and Thailand [7]. Jute fibre is used for making bags, decoratives, textiles and geotextiles. It has many advantages over synthetics and it is eco-friendly to the environment.

India ranks first in area coverage and production of jute accounting for 62.00% of the world's production. Yellow mite, *Polyphagotarsonemus latus* Banks is one of the major destructive pests of jute [22] and the loss caused by *P. latus* is reported to the extent of 10.00 - 42.00% depending on the level of infestation [18]. It has more than 250 hosts crossing family border in plants of agricultural and horticultural importance [24].

Its production and productivity is hampered by number of abiotic and biotic stresses [4]. Among them yellow mite, *Polyphagotarsonemus latus* (Banks) is devastating and often causing yield losses [23]. Yellow mite is the most economically important pest of jute causing leaf curl through sucking cell sap from tender epical leaf. The pest is reported from almost all the jute growing countries affecting equally both the cultivated species of jute with the estimated fibre yield loss of 42% [18]. Yellow mite (*Polyphagotarsonemus latus)*, is one of the most common and destructive pests of jute (*Corchorus olitorius L.).* Both yield and quality of fibre are reduced due to the attack of this pest. Due to the attack of this pest, the vertical growth of the internodes is suppressed thereby side branches are enhanced [16]. The yellow mite, *Polyphagotarsonemous latus* (Banks) (Acari: Tarsonemidae), is extremely polyphagous, and is found on more than 60 plant families [10].

The softer portions of the plants such as cotton [8], eggplant [21], jute [14] and grape [13] was attacked by this pest. The mites are usually found on the upper part of the plant, feeding on the apical shoots and the abaxial side of young leaves. Yellow mites are believed to be cell feeders, having styliform simple chelicerae that are only slightly reversible [12], with an approximate extended length of 43 microns [12]. In general, plant growth is inhibited [19]. Usually, the young apical leaves are heavily damaged, seem distorted, more rigid, and their edges curl downwards. The fruits, if any appear, may be cracked and sometimes reticulated [6]. Furthermore, farmers will have a chance to choose acaricides according to availability and cost. So, an attempt was taken considering the above mentioned aspect to conduct an experiment with the objectives was (i). to evaluate the efficacy of nine acaricides against jute yellow mite under natural condition at field level and compare with a standard chemical acaricide, (ii). to select effective and economic doses of these chemical acaricides for the jute grower's use.

Materials and Methods

Considering the above mentioned objectives, the experiment was conducted at three different locations. Pot experiment was conducted to dose fixation at Entomology department of Bangladesh Jute Research Institute (BJRI), Dhaka, Bangladesh and field experiment was conducted at Jute Agriculture Experimental Station (JAES), Manikganj and Jute Research Sub-Station, Tarabo, Narayanganj during the jute growing season (April-August) 2018 & 2019. Nine acaricides of different generic groups were used in this experiment which as follows Revenge 1.8EC(Abamectin 1.8%), Power Prid 95SP (Cartap 92% + Acetamiprid 3%), Lock 12SC(Chlorphenpyr 10%+ Emamectin Benzoate 2%), Parker 75 WG (Acetamiprid 50% + Buprofezin 25%), Brinka 24 SC (Spirodiclofen 24%), Guardian 40WDG(Emamectin Benzoate 20% + Thiamethoxam 20%), Aceto 40WDG(Acetamiprid 40%), Flame38WDG(Abamectin 2%+ Imidacloprid 36%), Aim Zox 10EC(Hexythiazox 10%EC) and Sunmectin 1.8 EC (Abamectin 1.8%) was used as standard.

Pot experiment: Tossa Jute variety O-9897 was grown in earthen pot at roof of Entomology department at Bangladesh Jute Research Institute (BJRI), Dhaka, Bangladesh. Seeds were sown in pots and pots were set following Randomized Complete Block Design (RCBD) with three replications. There were 5-6 plants in each pot allowed to grow. After 50 days of sowing**,** when natural infestation was found nine acaricides such as Revenge 1.8EC(Abamectin 1.8%), Power Prid 95SP (Cartap 92% + Acetamiprid 3%), Lock 12SC(Chlorphenpyr 10%+ Emamectin Benzoate 2%), Parker 75 WG (Acetamiprid 50% + Buprofezin 25%), Brinka 24 SC (Spirodiclofen 24%), Guardian 40WDG(Emamectin Benzoate 20% + Thiamethoxam 20%), Aceto 40WDG(Acetamiprid 40%), Flame38WDG(Abamectin 2%+ Imidacloprid 36%), Aim Zox 10EC(Hexythiazox 10%EC) were sprayed with their respective doses. Three different doses of each acaricides were tested to fix the effective and economic dose (Table 1).

Table 1: Three different doses of each insecticide tested for dose fixation.

Sl No.	Name of the Acaricides	Dose/ha
	Revenge 1.8EC(Abamectin 1.8%)	600ml/ha
		500ml/ha
2	Power Prid 95SP (Cartap 92% + Acetamiprid 3%)	250gm/ha
		225gm/ha
		200gm/ha
3	Lock 12SC (Chlorphenpyr 10%+ Emamectin Benzoate 2%)	600 ml/ha
		500ml/ha
		400ml/ha
4	Parker 75 WG (Acetamiprid 50% + Buprofezin 25%)	40gm/ha
		30gm/ha
		20gm/ha
5	Brinka 24 SC (Spirodiclofen 24%)	550ml/ha
		450ml/ha
		350ml/ha
6	Guardian 40WDG (Emamectin Benzoate 20% + Thiamethoxam 20%)	150gm/ha
		120gm/ha
		90gm/ha
7	Aceto 40WDG (Acetamiprid 40%)	850gm/ha
		750gm/ha
		650gm/ha
8	Flame38WDG (Abamectin 2%+ Imidacloprid 36%)	150gm/ha
		100gm/ha
		50gm/ha
9	Aim Zox 10EC(Hexythiazox 10%EC)	700ml/ha
		600ml/ha
		500ml/ha

Control pots were kept untreated. Population of yellow mite per square cm on leaf was recorded before spray and at 4rd and 7th day after spray under Electronic microscope. Data of% mortality at 4rd and 7th day after spray were taken. After calculating of the data considering the effectiveness at lowest doses following doses of acaricides namely Revenge 1.8EC(Abamectin 1.8%), Power Prid 95SP (Cartap 92% + Acetamiprid 3%), Lock 12SC(Chlorphenpyr 10%+ Emamectin Benzoate 2%), Parker 75 WG (Acetamiprid 50% + Buprofezin 25%), Brinka 24 SC (Spirodiclofen 24%), Guardian 40WDG(Emamectin Benzoate 20% + Thiamethoxam 20%), Aceto 40WDG(Acetamiprid 40%),

Flame38WDG(Abamectin 2%+ Imidacloprid 36%), Aim Zox 10EC(Hexythiazox 10%EC) @ 600ml/ha, 600ml/ha, 600ml/ha, 600ml/ha, 500ml/ha, 600ml/ha, 600ml/ha, 600ml/ha, 225gm/ha, 600ml/ha, 600ml/ha, 500ml/ha, 280ml/ha and 30gm/ha respectively were finally selected for recommendation of field examination

Percent mortality of infestation over control was calculated following Abbott's formula given below:

$$\% \text{ mortality over control} = \frac{(\text{No. of yellow mite/sq.cm in control plot}) - (\text{No. of yellow mite/sq.cm in treated plot})}{(\text{No. of yellow mite/sq.cm in control plot})} \times 100$$

Field experiment: Field experiment was conducted in two different locations *viz.* in JAES, Manikganj and Sub-Station, Tarabo, Narayanganj. The jute variety O-9897 was grown in unit plot size of 2 x 2.1 m^2 with three replications following Randomized Complete Block Design (RCBD). Fourteen new acaricides along with one standard acaricides such as Revenge 1.8EC(Abamectin 1.8%), Actos 1.8EC (Abamectin 1.8%), World 1.8EC (Abamectin 1.8%), H-aba 1.8% (Abamectin 1.8%), Lock 12SC(Chlorphenpyr 10%+ Emamectin Benzoate 2%), Himectin 1.8EC (Abamectin 1.8%), Bio-mectin 1.8EC (Abamectin 1.8%), Best Albatin 1.8EC(Abamectin 1.8%), Power Prid 95SP (Cartap 92% + Acetamiprid 3%), KB Mite 1.8EC (Abamectin 1.8%), Beni 1.8 EC(Abamectin 1.8%), Brinka 24 SC (Spirodiclofen 24%), Power 25EC(Abamectin 1.8%), Parker 75 WG (Acetamiprid 50% + Buprofezin 25%) and Sunmectin 1.8 EC (Abamectin 1.8%) @ 600ml/ha, 225gm/ha, 500ml/ha, 30gm/ha, 450ml/ha, 120gm/ha, 750gm/ha, 100gm/ha, 600ml/ha respectively were sprayed after 60 days of sowing when sufficient yellow mite infestation was found in the plot naturally. No acaricide was sprayed in control plots. Population of yellow mite infestated plant was recorded before spray and at 4^{th} and 7^{th} days after spray.

Percent reduction of infestation over control was calculated following Handerson Tilton formula given below:

$$\% \text{ Reduction over control} = \frac{(\text{No. of yellow mite infested plant in control plot}) - (\text{No. of yellow mite infested plant in treated plot})}{\text{No. of yellow mite infested plant in control plot}} \times 100$$

Statistical analysis

Data were analyzed by statistix 10 software and means were separated LSD test.

Results and Discussion

Three doses of all insecticides were applied at roof pot condition where the second one was proposed by respective companies and the other two doses were higher one and lower one from the proposed dose. It was found from the results that the higher doses were little more effective than proposed dose or similarly effective in respect of mortality but these doses were not cost effective and lower doses were less effective than the proposed doses. So, proposed doses were selected for the field trial. Detailed results are given in (table 2).

Table 2: Preliminary dose fixation trial at Entomology department of Bangladesh Jute Research Institute (BJRI), Dhaka, Bangladesh.

Sl. No.	Name of the Acaricides	Dose/ha	No. of yellow mite/sq.cm before spray(Average)	Percent mortality of yellow mite/sq.cm after spray (Average)	
				48HAT	72HAT
1	Revenge 1.8EC (Abamectin 1.8%)	650ml/ha	64.00	73.30	94.51
		600ml/ha	66.33	69.20	85.41
		550ml/ha	60.67	63.45	76.74
2	Power Prid 95SP (Cartap 92% + Acetamiprid 3%)	250gm/ha	70.33	71.10	90.00
		225gm/ha	62.67	67.79	87.94
		200gm/ha	66.33	63.81	76.39
3	Lock 12SC (Chlorphenpyr 10%+ Emamectin Benzoate 2%)	550 ml/ha	62.67	72.12	92.50
		500ml/ha	69.00	67.63	88.39
		450ml/ha	68.00	64.63	78.65
4	Parker 75 WG (Acetamiprid 50% + Buprofezin 25%)	40gm/ha	63.00	72.11	91.57
		30gm/ha	60.00	68.89	86.11
		20gm/ha	60.00	63.89	76.67
5	Brinka 24 SC (Spirodiclofen 24%)	500ml/ha	67.00	72.14	90.55
		450ml/ha	65.00	69.23	86.67
		400ml/ha	57.00	64.91	77.19
6	Guardian 40WDG(Emamectin Benzoate 20% + Thiamethoxam 20%	150gm/ha	69.00	70.53	92.75
		120gm/ha	55.00	66.06	88.48
		100gm/ha	80.00	63.33	78.75
7	Aceto 40WDG (Acetamiprid 40%)	800gm/ha	80.00	75.00	91.25
		750gm/ha	75.00	71.56	88.00
		700gm/ha	72.00	65.74	78.70
8	Flame38WDG (Abamectin 2%+ Imidacloprid 36%)	150gm/ha	80.00	72.50	92.08
		100gm/ha	76.00	69.74	89.04
		50gm/ha	78.00	65.81	79.06
9	Aim Zox 10EC(Hexythiazox 10%EC)	650ml/ha	72.00	71.30	90.74
		600ml/ha	70.00	67.14	87.14
		550ml/ha	74.00	62.61	77.48

(N.B. HAT= Hours after Treatment)

Effect of acaricides on mite population and yield at two locations in two years

In case of 2018 at Manikganj at 7DAS (DAS= Days after Spraying), the highest percent reduction of jute yellow mite (97.12%) was obtained from the plot treated with Revenge 1.8EC (Abamectin 1.8%) which was statistically similar to all other acaricides except Flame38WDG (Abamectin 2%+ Imidacloprid 36%) and Sunmectin 1.8 EC (Abamectin 1.8%) (Standard). Goldsmith and James [11] reported that abamectin gave satisfactory control against this mite. Piao *et al.* [20] found maximum percent mortality of *P. latus* on jute after application of Abamectin 1.8 @ 0.5 ml/l. The lowest percent reduction was obtained in control plot that was statistically different from others. At 7DAS in Manikganj, the highest yield (3.17 t/ha) was found in the plot treated with Revenge 1.8EC (Abamectin 1.8%) which was statistically similar to all other acaricides except Brinka 24 SC (Spirodiclofen 24%), Aceto 40WDG (Acetamiprid 40%) and Flame38WDG (Abamectin 2%+ Imidacloprid 36%). Among the treated plots at Narayanganj at 7DAS in 2018, the highest percent reduction of jute yellow mite (96.36%) was obtained from the plot treated with Power Prid 95SP (Cartap 92% + Acetamiprid 3%) which was statistically similar to Revenge 1.8EC(Abamectin 1.8%), Lock 12SC(Chlorphenpyr 10%+ Emamectin Benzoate 2%), Brinka 24 SC (Spirodiclofen 24%), Guardian 40WDG(Emamectin Benzoate 20% + Thiamethoxam 20%), Aceto 40WDG(Acetamiprid 40%),Aim Zox 10EC(Hexythiazox 10%EC) and standard. Highest yield (2.98t/ha) was found in the plot treated with Power Prid 95SP (Cartap 92% + Acetamiprid 3%) which was statistically similar to Revenge 1.8EC (Abamectin 1.8%), Parker 75 WG (Acetamiprid 50% + Buprofezin 25%) and Guardian 40WDG (Emamectin Benzoate 20% + Thiamethoxam 20%). At 7 DAS all the acaricides showed 80% reduction of infestation of jute crops (Table 3).

Table 3: Effect of insecticides on mite population and yield at two locations in 2018

Treatment	Dose/ha	Manikganj, 2018					Narayanganj,2018				
		Total plant	Infested plant before spray	% reduction		Yield (ton/ha)	Total plant	Infested plant before spray	% reduction		Yield(ton/ha)
				3DAS	7DAS				3DAS	7DAS	
T_1	600ml/ha	208.33	103.33	86.70A	97.12A	3.17A	195.00	78.33	86.36A	94.85AB	2.83AB
T_2	225gm/ha	209.33	86.67	81.30AB	96.10A	3.02AB	212.67	91.67	83.66AB	96.36A	2.98A
T_3	500ml/ha	234.67	78.33	81.46AB	95.20AB	2.91AB	211.00	70.00	78.46C	93.79ABC	2.60BC
T_4	30gm/ha	210.00	79.33	82.14AB	93.16AB	2.76AB	193.33	92.67	80.10BC	90.89BCD	2.68ABC
T_5	450ml/ha	213.33	90.00	79.58AB	95.23AB	2.57BC	208.67	74.33	78.36C	93.32ABC	2.61BC
T_6	120gm/ha	220.00	86.67	81.66AB	93.40AB	3.07AB	210.00	85.00	80.54BC	94.85AB	2.70ABC
T_7	750gm/ha	218.00	73.33	86.39AB	92.50AB	2.54BC	198.00	85.33	79.51BC	90.26CD	2.64BC
T_8	100gm/ha	209.67	90.00	83.04AB	90.33B	2.18CD	192.00	71.67	79.41BC	88.69D	2.51BC
T_9	600ml/ha	211.33	70.00	83.73AB	93.87AB	2.98AB	221.33	93.33	79.33BC	93.92ABC	2.45C
$T1_0$	600ml/ha	195.33	80.00	77.67B	94.89AB	2.78AB	195.33	78.67	80.08BC	94.92AB	2.63BC
T_{11}	600ml/ha	209.67	74.33	28.98C	41.84C	1.82D	189.00	79.00	25.40D	40.96E	1.94D
LSD (5%)				8.74	5.33	0.5599			4.7678	4.5772	0.3362
CV				6.62	3.50	12.14			3.70	3.04	7.60

N.B.
T_1= Revenge 1.8EC (Abamectin 1.8%)
T_2= Power Prid 95SP (Cartap 92% + Acetamiprid 3%)
T_3= Lock 12SC (Chlorphenpyr 10%+ Emamectin Benzoate 2%)
T_4= Parker 75 WG (Acetamiprid 50% + Buprofezin 25%)
T_5= Brinka 24 SC (Spirodiclofen 24%)
T_6= Guardian 40WDG (Emamectin Benzoate 20% + Thiamethoxam20%
T_7= Aceto 40WDG (Acetamiprid 40%)
T_8= Flame38WDG (Abamectin 2%+ Imidacloprid 36%)
T_9= Aim Zox 10EC (Hexythiazox 10%EC)
T_{11} =Control
T_{10}= Sunmectin 1.8 EC (Abamectin 1.8%)

In case of Manikganj in 2019 at 7DAS (DAS= Days After Spraying), the highest percent reduction of jute yellow mite (96.45%) was obtained from the plot treated with Lock 12SC (Chlorphenpyr 10%+ Emamectin Benzoate 2%) which was statistically similar to all other acaricides except Guardian 40WDG (Emamectin Benzoate 20%+ Thiamethoxam 20% and Flame38WDG (Abamectin 2%+ Imidacloprid 36%). A. Rahman found higher reduction of mite infestation after 7 and 10 days of spraying with the acaricide causing a reduction of (72.25% and 80.15%) pest infestation in jute plant respectively [1]. The lowest percent reduction was obtained in the plot that was sprayed with Guardian 40WDG (Emamectin Benzoate 20%+ Thiamethoxam20%) that was statistically similar to Flame38 WDG (Abamectin 2%+ Imidacloprid 36%). Ajit pratap singh reported that thiamethoxam and imidacloprid showed Moderate infestation on chilli mite [2]. In case of yield in Manikganj, the highest yield(3.19 t/ha)was found in the plot treated with Parker 75 WG (Acetamiprid 50% + Buprofezin 25%) which was statistically similar to all other acaricides except Treatment 6,7,8 & 10. Lowest yield (2.27 t/ha) was found in the plot treated with treatment 8 that was statistically similar to treatment 6, 7 &10. Among the treated plots at Narayanganj at 7DAS in 2019, the highest percent reduction of jute yellow mite (96.21%) was obtained from the plot treated with Aim Zox 10EC (Hexythiazox 10%EC) which was statistically similar to all treatment except treatment 8. Highest yield (3.20t/ha) was found in the plot treated with Aim Zox 10EC (Hexythiazox 10%EC) which was statistically similar to all other treatments except treatment 1. At 7 DAS all the acaricides showed 80% reduction of infestation of jute crops (Table 4).

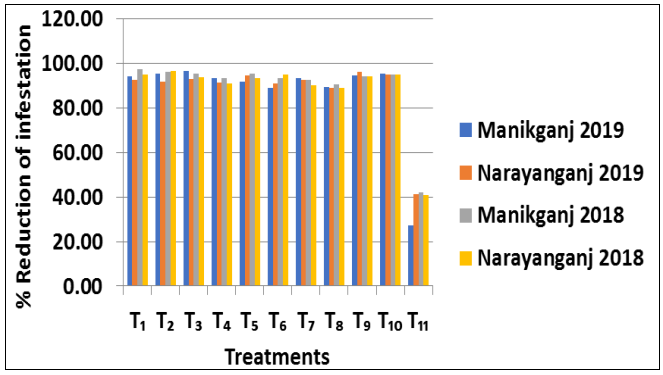
Table 4: Effect of insecticides on mite population and yield at two locations in 2019

Treatment	Dose/ha	Manikganj, 2019					Narayanganj, 2019				
		Total plant	Infested plant before spray	% reduction		Yield (ton/ha)	Total plant	Infested plant before spray	% reduction		Yield (ton/ha)
				3DAS	7DAS				3DAS	7DAS	
T_1	600ml/ha	190.67	83.33	80.00AB	94.02ABC	3.07AB	180.33	81.67	80.10AB	92.27AB	2.70B
T_2	225gm/ha	193.33	84.67	78.99B	95.33A	3.09AB	196.00	90.00	82.24AB	91.72AB	3.10AB
T_3	500ml/ha	193.33	80.00	82.25AB	96.45A	2.83ABC	204.33	80.33	81.34AB	93.05AB	2.99AB
T_4	30gm/ha	186.00	90.67	83.00A	93.12AC	3.19A	193.33	66.33	78.59B	91.13AB	3.03AB
T_5	450ml/ha	213.33	71.00	80.88AB	91.65ABC	3.14A	198.67	78.33	79.73AB	94.33AB	2.99AB
T_6	120gm/ha	206.67	68.33	81.47AB	88.83C	2.42CD	203.33	65.00	80.35AB	90.81AB	3.05AB
T_7	750gm/ha	191.33	78.33	81.30AB	93.22ABC	2.35CD	189.67	68.00	79.81AB	92.54AB	2.97AB
T_8	100gm/ha	209.00	65.00	82.58AB	89.07BC	2.27CD	188.33	80.00	79.97AB	88.99B	2.94AB
T_9	600ml/ha	204.67	83.33	81.79AB	94.54AB	2.65ABC	203.00	85.00	80.25AB	96.21A	3.20A
$T10_0$	600ml/ha	184.67	81.67	81.21AB	95.12A	2.49BCD	182.67	91.67	86.22A	95AB	3.05AB
T_{11}	600ml/ha	185.00	72.00	18.50C	27.25D	1.87D	226.67	90.00	37.31C	41.42C	1.85C
LSD (5%)				3.8449	5.6295	0.6272			6.6087	6.6644	0.3972
CV				2.98	3.79	13.79			5.05	4.45	8.05

N.B.
T_1= Revenge 1.8EC (Abamectin 1.8%)
T_2= Power Prid 95SP (Cartap 92% + Acetamiprid 3%)
T_3= Lock 12SC (Chlorphenpyr 10%+ Emamectin Benzoate 2%)
T_4= Parker 75 WG (Acetamiprid 50% + Buprofezin 25%)
T_5= Brinka 24 SC (Spirodiclofen 24%)
T_6= Guardian 40WDG (Emamectin Benzoate 20% + Thiamethoxam20%
T_7= Aceto 40WDG (Acetamiprid 40%)
T_8= Flame38WDG (Abamectin 2%+ Imidacloprid 36%)
T_9= Aim Zox 10EC (Hexythiazox 10%EC)
T_{11} =Control
T_{10}= Sunmectin 1.8 EC (Abamectin 1.8%)

Percent reduction of yellow mite infestation in 7 DAS at two locations in two years

From the graph, it revealed that all the acaricides showed different percent reduction of infestation. Among all the acaricides, highest (97.12%) reduction of infestation was found in the plot that was treated with Revenge 1.8EC (Abamectin 1.8%) in Manikganj 2018 at 7DAS and lowest (88.69%) reduction of infestation was found in the plot that was treated with Flame38WDG (Abamectin 2%+ Imidacloprid 36%) in Narayanganj 2018 at 7DAS All acaricides including standard gave more than 88% reduction of yellow mite infestation in field condition(Fig.1). S. Jeyarani [25] conducted similar experiment on chilli and found more or less similar infestation on chilli spraying some new acaricide molecules. But the plot that was untreated/controlled showed different level of percent reduction of infestation giving 41.84% highest reduction of infestation in Manikganj 2018 at 7DAS. So it is normally revealed that acaricides has important effect on yellow mite reduction of infestation. B.S. Gotyal [3] said that acaricides significantly reduced the mite infestation in jute, but abamectin followed by dicofol (18.5 EC) and fenazaquin (10 EC) gave better protection of mites. Since all the acaricides showed more than 80% reduction of *P. latus*, so all acaricides can be recommended for farmer's use to control yellow mite.



N.B.
T_1= Revenge 1.8EC (Abamectin 1.8%)
T_2= Power Prid 95SP (Cartap 92% + Acetamiprid 3%)
T_3= Lock 12SC (Chlorphenpyr 10%+ Emamectin Benzoate 2%)
T_4= Parker 75 WG (Acetamiprid 50% + Buprofezin 25%)
T_5= Brinka 24 SC (Spirodiclofen 24%)
T_6= Guardian 40WDG (Emamectin Benzoate 20% + Thiamethoxam20%
T_8= Flame 38WDG (Abamectin 2%+ Imidacloprid 36%)
T_7= Aceto 40WDG (Acetamiprid 40%)
T_9= Aim Zox 10EC (Hexythiazox 10%EC)
T_{10}= Sunmectin 1.8 EC (Abamectin 1.8%)
T_{11} =Control

Fig 1: Percent reduction of yellow mite infestation in 7DAS at two locations in two years

Conclusion

From the results of this two-year experiment, it was observed that yellow mite of jute caused by *Polyphagotarsonemus latus* is a major pest of jute (*C. olitorious*) in Bangladesh that results in economic losses. The performance of all tested acaricides considering percent reduction of infestation over control (> 88%) and yield (>2.45 ton/ha) were more or less similar to the standard and better than control. So, all the acaricides were suggested to recommend for the farmer's use for controlling jute yellow mite at field level.

Acknowledgement

The authors are grateful to Department of Entomology, Bangladesh Jute Research Institute, and Bangladesh for providing all kinds of financial and technical support to design and carried out the experiment.

References

1. Rahman A, Islam KS, Jahan M, Islam N. Efficacy of three botanicals and a microbial derivatives acaricide (Abamectin) on the control of jute yellow mite, *Polyphagotarsonemus. Latus*.
2. Ajit Pratap Singh, Singh RN. Management of yellow mite, *Polyphagotarsonemus latus* (Acari: Tarsonemidae) in chilli.2013. Indian Journal of Agricultural Sciences, 83(11), 1250-2.
3. Gotyal BS, Selvaraj K, Satpathy S, Mitra S. Effect of sowing dates and insecticides on yellow mite, *Polyphagotarsonemus latus* infestation in jute. J ent. Res. 2018; 42(1):13-18.
4. Chakraborty AK, Ghorai AK, De RK, Chakraborty S, Jha SK, Mitra S. Expert system for integrated stress management in jute (*Corchorus olitorius* L. and *C. capsularis* L.). International Journal of Bio-resource and Stress Management. 2013; 4(2):192-200.
5. Cho MR, Jeon HY, La SY, Kim DS, Yiem MS. Damage of broad mite, *Polyphagotarsonemus latus* (Banks), on pepper growth and yield and its chemical control. Korean J. Appl. Entomol. 1996 a.; 35:326-331.
6. Cho MR, Jeon HY, Kim DS, Chung BS, Yiem MS, Kim SB. Host plants and damage of broad mite (*Polyphagotarsonemus latus*) on horticultural crops. Rural Development Administration Journal of Agricultural Sciences. 1996b; 38:516-525.
7. Chowdhury H, Gotyal BS, Selvaraj K, Sarkar SK. Bioefficacy of plant extracts on stem rot, *Macrophomina phaseolina* (Tassi) Goid and Bihar hairy caterpillar, *Spilosoma oblique* Walker in jute crop. Journal of Applied and Natural Science. 2016; 8(1):191-195.
8. Cividanes FJ, Thomazini MJ, de Santos C, LG. Distribuição do ácaro branco, 1987.
9. Das H, Poddar P, Haque S, Pati S, Poddar R, Kundu CK. Seed yield and economics of white jute as influenced by different dates of sowing, spacing and topping schedule in Terai region of West Bengal. International Journal of Farm Sciences. 2014; 4(4):51-58.
10. Gerson U. Biology and control of the broad mite, *Polyphagotarsonemus latus* (Banks) (Acari: Tarsonemidae). Experimental & Applied Acarology. 1992; 13:163-178.
11. Goldsmith J, James O. Chemical control of the broad mite (*Polyphagotarsonemus latus* Banks) on hot pepper. JAGRIST. 2002; 14:105-09.
12. Gui L, Gong X, Meng G, Gui LY, Gong XW, Meng GL. On the relationship between eggplant leaf structure and its resistance to broad mite. Acta Phytophylacica Sinica. 2001; 28: 213-217.
13. Haji FNP, Moreira AN, Lopes PRC, Ferreira RCF, de Alencar JA, Barbosa FR. Monitoramento e determinacies do nível de ação do ácaro-branco na cultura da uva. Petrolina, EMBRAPA Semi-Árido, 7p. (EMBRAPA Semi-Árido, Circular Técnica, 2001, 68.
14. Hath TK. Distribution of yellow mite (*Polyphagotarsonemus latus* Banks) population on leaves of different jute varieties. Environ. Ecol. 2000; 18:578-580.
15. Jepsson LR, Keiffer HH, Baker EW. Mites injurious to economic plants Univ. California Press, Los Angeles, 1975.
16. Kabir AKMF. Jute pest of Bangladesh. Bangladesh Jute Research Institute. Dacca. 1975; 15:28-36.
17. Kundu BC. Jute: World's foremost bast fibre II. Technology, marketing, Production and utilization. Econ. Bot. 1956; 10:203-40.
18. Pandit NC, Rao PV, Chakraborty AK. Studies on the biotic and abiotic factors on the incidence of yellow mite of jute In: Annual Report: 2000-2001 and 2001-2002, Central Research Institute for Jute and Allied Fibres. Barrackpore, 2002, 71.
19. Peña JE, Bullock RC. Effects of feeding of broad mite (Acari: Tarsonemidae) on vegetative plant growth. Florida Entomologist. 1994; 77:180-184.
20. Piao CS, Zhou YS, Liu LC, Zheng YC. Determination of the toxicity of several acaricides to susceptible populations of Tetranychus urticae. Pl. Prot. 1999; 25:20-22.
21. Queiroz FLR, de L, de Oliveira JV. Níveis de infestação dos ácaros *Tetranychus neocaledonicus* (André, 1933) e *Polyphagotarsonemus latus* (Banks, 1904) em diferentes fases do desenvolvimento da berinjela (*Solanum melongena* L.). Cad. Ômega, Ser. Agron. Recife. 1992; 4:183-189.
22. Rahman S, Khan MR. Incidence of pests and avoidable yield losses in jute Ann. Pl. Protec. Sci. 2006; 14:304-05.
23. Rahmana S, Khan MR. Evaluation of pesticides against major pests of jute (*Corchorus olitorius* L.) in West Bengal, India. Archives of Phytopathology and Plant Protection. 2012; 45(6):620-634.
24. Rai AB, Satpathy S, Gracy GR, Swamy TMS, Rai M. Yellow mite, *Polyphagotarsonemus latus* Banks menace in chilli crop. Veg Sci. 2007; 34:1-13.