

**INCIDENCE, DAMAGE POTENTIAL AND MANAGEMENT OF
JASSIDS IN GROUNDNUT FIELD**DR. G. C. BISWAS¹

Keywords : Incidence, damage severity, jassid, groundnut.

The studies were made on the incidence, damage severity and management of jassid in groundnut in the experimental field during Rabi season of two consecutive years 2011-12 and 2012-13. The highest jassid population (24.25/plant) and leaf infestation (54.25%) were observed in the second week of April at the pod formation stage of the crop. Among the treatments, Imidacloprid (Admire 200SI @ 0.50ml/l) reduced significantly the highest jassid population (80.25%) as well as leaf infestation (54.25%) over the untreated control. The pod yield was significantly highest (1.60 t/ha) obtained from Admire treated plot and calculated high BCR (3.16) followed by Dimethoid (Tafgor 40EC @ 2ml/l) treated plot having pod yield of 1.53t/ha and BCR 2.60.

Groundnut (*Arachis hypogaea* L.) is the second important oilseed crop after rapeseed and mustard on the basis of area and annual production in Bangladesh (Biswas *et al.*, 2000). Its cultivation covered about 95,000 hectares of land and produced about 1,40,000 metric tones of seeds during 2011-2012 (Anon. 2013). It is a good source of oil (48-52%) and protein (25-30%) (Kaul and Das 1986). Jassid (*Empoasca terminalis*) the important foliage pest of groundnut and acts as limiting factors in successful cultivation of the crop in South- East Asia especially in India and Bangladesh (Ahmed *et al.*, 1989; Begum, 1995; Biswas *et al.*, 2000; Biswas *et al.*, 2009 ; Biswas and Das 2011; and Singh, 1990). Both the nymphs and adults of Jssids suck the sap from the tender leaf and under surface of the leaflet causing yellowing the leaflets, leaf curling, necrosis. V shaped yellowing appears at the tip of the leaflets resulting stunted growth and gradually die. It also acts as a vector of leaf curled, tomato spotted and other viruses (Singh, 1990). Infested leaves become spotted, pale and sickly curled (Amin and Palmer, 1985). Incidence of jassid on groundnut crop, losses, and suitable management techniques are of very important. Information on these aspects of jassid in groundnut crop field are scanty in Bangladesh. The research work was undertaken to know the incidence, extent of damage and to develop the suitable management techniques for jassid in groundnut crop.

The experiment was conducted in the field of the Oilseed Research Centre, Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur, during Rabi season of two consecutive years 2011-12 and 2012-13. Seeds of groundnut variety BARI Chinabadam-9 were sown on November 27, 2011 and 2012 in 4m

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X 3m plots in Randomized Complete Block design with 3 replications. There were five treatments, namely, application of detergent (Jet powder) 3g/litre, Crude Neem seed mixture (NSM) @ 50 g/l, Spraying of Dimethoid (Tafgor 40 EC @ 2ml/l), Spraying of Imidacloprid (Admire 200SI) @ 0.5 ml/l of water and Untreated control with only water were used uniformly. The recommended agronomic practices like fertilizers and other intercultural operations were maintained for raising the crop (Mondal and Wahhab, 2001).

Fresh ripe and sun dried neem seeds (5 kg) were crushed and then added 10 litres of water and kept over night. Then the solution was sieved with fine mesh net and added 10 g of detergent and the solution was prepared for spray. This is known as crude neem seed and detergent mixture. The detergent, botanicals and other insecticides were applied with the help of knapsack sprayer in three frequencies on the crop in second and last week of February 2012 and 2013 at the vegetative and flowering stages of the crop at 10 days intervals. The population of jassids were recorded from the crop during February - May in both the years. The leaf infestation caused by jassids was recorded on February - May in 2012 and 2013 at the vegetative, flowering and pod forming stages of the crop. Randomly 10 plants were selected per plot for counting jassid population. Percent leaf damage by jassids was recorded by counting leaves from five (5) selected plant population in each treatment. Percent leaf infestation reduction over untreated in each treatment was calculated. The crop was harvested on last week of May in each year. Seed yield of different treatments were recorded. Weather data mainly temperature was also recorded during the study period in both the years. Data were compiled and analyzed statistically. Analysis of variance (ANOVA) was done following MSTATE C and means were separated following Duncan's multiple range test (DMRT). Benefit cost ratio (BCR) of the different treatments was also calculated.

Jassid population was observed in the groundnut crop during first week of February in 2012 at the vegetative and flowering stages of the crop and continued up to second week of May at the pod formation stage. The maximum jassid population was observed (24.25/plant) in the second week of April 2012 and then gradually decreased (Fig.1). Almost similar increasing trend of jassid population was observed during 2013. But slightly higher jassid population (25.68/plant) was observed in 2013 than in 2012 (Fig. 2). Leaf infestation by jassid showed the similar pattern in both the years. The highest leaf infestation caused by jassid was 52.54% recorded in 2012 (Fig. 1) and slightly higher leaf infestation rate by jassid (55.68/plant) in 2013 than in 2012 (Fig. 2). It was observed that jassid population and leaf infestation in groundnut crop increased in time with the increasing average temperature (From 23⁰ C -30⁰ C) in two years (Figs 1 and 2.).

Almost similar results were reported by Campbell (1986), Santos and Sutton, (1983), Singh *et al.*, (1990) Jayanthi *et al.*, (1993) in India and Biswas *et al.*, (2000) in Bangladesh. Amin (1983) observed jassid population buildup in May and June in India. Turnjit and Campbell (1989) reported that more than 40% groundnut leaf damaged by jassids and thrips up to six weeks after sowing and causing yield loss of 5-10%. Campbell (1986) indicated that when 60% of groundnut leaves were scorched by jassids then yield loss could be detected and when all leaves were scorched by jassids then yield loss was only about 15 percent.

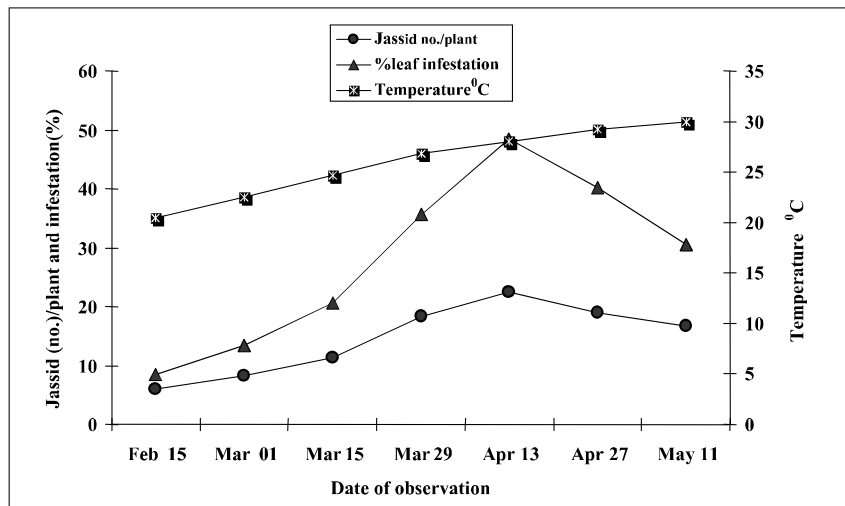


Fig 1. Number and infestation of jassids in groundnut in 2012 at BARI Gazipur.

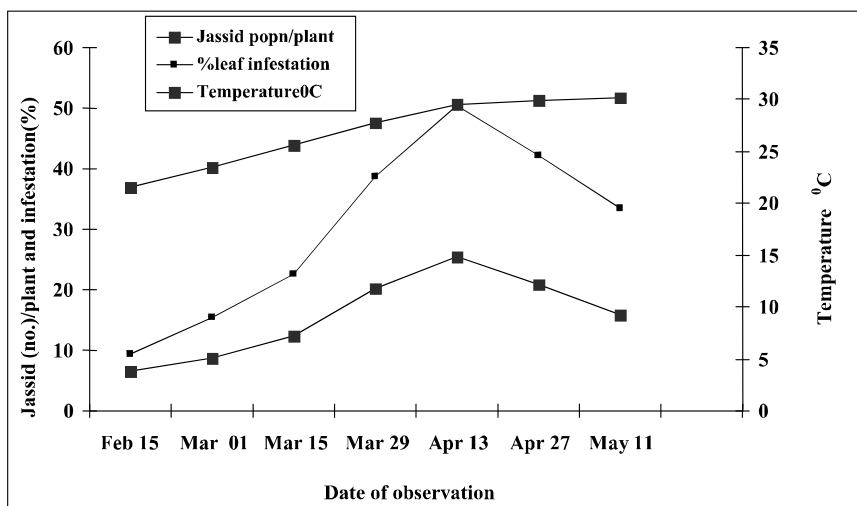


Fig 2. Number and infestation of jassids in groundnut in 2013 at BARI Gazipur.

Efficacy of jet powder, neem seed mixture and chemical insecticides in controlling jassids in groundnut crop during 2012 and 2013 is presented in Table 1. All the treatments reduced jassid population with significant variation among them. Of these Imidacloprid (Admire 200SL @ 0.50ml/l) reduced significantly the highest jassid population (80.25%) over the untreated. Reduction of jassid occurred by 65-68% in Tafgor (Dimethoid) 40 EC @2ml/l and neem seed mixture+Jet powder treated plots and these two treatments caused similar controlling effects on jassid next to Imidacloprid (admire, 82.72%) while Jet powder @ 3g/l reduced the lowest jassid population (49.86%) over the untreated control. The leaf infestation by jassid had the same trend as the number in all the treatments with the highest efficacy of Imidacloprid resulted 80.72% reduction over untreated control. The lowest efficacy was recorded in jet powder treatment (Table 2). Almost similar information was recorded by Campbell (1986) in India and Biswas *et al.*, (2009 and 2011) in Bangladesh.

Table 1. Number of jassids and reduction of its population over control in different treatments in groundnut crop in two years pooled data.

Treatments	Number of jassid/plant after three times of spray				% Population reduction over untreated
	7 days after 1st spray	7 days after 2nd spray	7 days after 3rd spray	Mean	
Jet powder @ 3g/L	15.60 b	10.40 b	08.00 b	11.40 b	49.86 c
NSM + jet powder	12.00 c	08.50 c	06.50 c	8.80 c	65.07 b
Tafgor @ 2 ml/L	10.00 c	06.50 c	05.50 c	7.66 c	68.58 b
Admire @0.5 ml/L	08.50 d	05.50 d	02.00 d	5.00 d	80.72 a
Untreated	20.50 a	25.50 a	35.00 a	25.67 a	-

Means followed by the same letter in a column did not differ significantly at 5% level by DMRT. Neem Seed Mixture= NSM.

Table 2. Percent of leaf infestation in different treatments used against jassids in groundnut in the pooled data of 2012 and 2013 at Gazipur.

Treatments	Leaf infestation(%) by jassid recorded on				% infestation reduction over untreated
	7 days after 1st spray	7 days after 2nd spray	7 days after 3rd spray	Mean leaf infestation (%)	
Jet powder @ 3g/L	30.60 b	21.40 b	18.00 b	23.40 b	49.86 c
NSM + jet powder	23.00 c	15.50 c	10.50 c	16.30 c	65.07 b
Tafgor @ 2 ml/L	22.00 c	13.50 c	8.50 c	14.66 c	68.58 b
Admire @0.5 ml/L	13.50 d	8.50 d	5.00 d	9.00 d	80.72 a
Untreated	40.50 a	56.50 a	65.00 a	54.67 a	-

Means followed by the same letter in a column do not differ significantly at 5% level by DMRT. Data were recorded in average of 10 plants/plot. . Neem Seed Mixture= NSM.

Table 3. Benefit cost ratio of different treatments against jassid in groundnut from the pooled data of 2012 and 2013 at BARI, farm Gazipur

Treatments	Seed yield (t/ha)	Increased yield over untreated	Additional income (TK./ha)	Cost of insecticides & spray	Net income (TK./ha)	BCR
Jet powder @3g/L	1.43 bc	0.08	4000.00	1500.00	2500.00	1.66
NSM + jet powder	1.48 ab	0.13	6500.00	2000.00	4500.00	2.25
Tafgor @ 2ml/L	1.53 ab	0.18	9000.00	2500.00	6500.00	2.60
Admire @0.5 ml/L	1.60 a	0.25	12500.00	3000.00	9500.00	3.16
Untreated	1.35 d	-	-	-	-	-

Means followed by the same letters in a column do not differ significantly at 5% level by DMRT.

Price of Jet powder = 250, Price of Admire = 10000 Tk./L, Price of Tafhor = 800 TK./L

Price of groundnut seed= 50 Tk./kg, Cost of neem seed = 50 Tk./Kg, Cost of labour=200 Tk./labour/day , Three labours and 0.5 litre of Tafgor 40 EC @ 2 ml/l being required for 1 hectare of crop field sprayed in one time. One machine spray volume = 10 litre required 200 sqm field spraying in one time. Other variable costs were same in all the treatments.

BCR= Net income/ Management cost

The Benefit Cost Ratio (BCR) analysis of different treatments in suppressing jassids in groundnut crop is presented in the Table 3. The result revealed that significantly the highest pod yield of groundnut was obtained from Admire 200 SI treated plot (1.60 t/ha) and calculated the highest BCR (3.16) followed by that of Tafgor 40 EC treated plot (2.60). The groundnut pod yield was 1.53 t/ha which was not statistically significant different from that of neem seed mixture + jet powder treated plot (Table 3). Significantly the lowest pod yield was recorded from the untreated control plot (1.35t/ha) and the lowest BCR was calculated from Jet powder treated plot (1.66)(Table 3). Similar information was also reported by Amin and palmer (1985), Singh (1990) in India and Ahmed *et al.*, (1989) and Biswas *et al.*, (2009 and 2011) in Bangladesh.

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