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Effect of improved cultivation practices on incidence of jassid, *Amrasca biguttula biguttula* in okra [*Abelmoschus esculentus* (L.) Moench]

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Abstract

An experiment was conducted at College of Agriculture, Bikaner to find out the effect of improved cultivation practices *viz.,* irrigation methods, planting of different cultivars and uses of mulches on incidence of jassid (*Amrasca biguttula biguttula)* in okra. The results of the experiment revealed that in case of irrigation methods, the minimum number of jassid (1.73/3 leaves) was recorded in 0.6 volume of drip irrigation while maximum (5.45/ 3 leaves) was observed in 1.0 volume of surface irrigation. Planting of different cultivar was not significantly influence the incidence of jassid. In the treatments when mulches were used, this minimum number of jassid (2.69/ 3 leaves) was recorded in bui mulch while maximum number of jassid was recorded in those treatments when mulches were not used.

key words: *Cultivars, drip irrigation, jassid, mulches, okra*

Introduction

Okra is one of the important hardy fruit vegetable grown throughout the country in warm climate. Its fruits are highly delicious and nutritionally rich in potassium, calcium, iron, thiamine and vitamin 'C 'and crude fibre and mainly used for preparation of stuff vegetables. It occupies an area of 0.40 million hectare with production of 4.19 million tonnes in the country (Anonymous, 2008). In Rajasthan, it is being cultivated in 3200 hectare area with production of 18000 tonnes (Anonymous, 2009). Many factors are responsible for low productivity and production of okra but insect pests have been reported to cause substantial damage to the okra crop.

Among these, jassid [*Amrasca biguttla biguttla*] (Ishida) (Homoptera: Cicadellidae) is most important in the tropics and subtropics because environmental conditions are often conducive year round for growth and development of host and pest (Singh *et al.*, 1993; Kakar and Dobra, 1988). Jassid are very serious pest in dry weather condition or whenever there is a spell of drought. Both nymphs and adults of this wedge shaped pale green leaf-hopper suck the sap from the lower surface of leaves and injecting some toxic material resulting in curling of leaves upward and plant growth is stunted. Severe infestation cause burnt leaves which fall down later. There is drastic decrease in yield (Singh, 1998). The maximum productivity of okra and minimum incidence of jassid were obtained by judicious use of irrigation water by drip irrigation and mulches. The concept of drip irrigation is to create a continuous wetted strip along the plant line. The even supply of water and nutrients directly to the root zone creates an optimal environment for the roots to efficiently absorb the soil nutrients for appropriate growth of the plants. The people are realizing that drip system is the only way to use this natural resource in judicious manner so that maximum yield can be obtained from a single drop of water with minimum jassid infestation over surface irrigation. One of the important aspect of improvement in yield, quality of okra and minimum jassid infestation was selection of suitable cultivars to a particular agro-climatic region. Use of mulches regulates soil moisture, stabilize soil temperature, suppress weed growth, minimize leaching losses of nutrients, check excessive evaporation, reduce soil erosion, minimum jassid population by maintaining optimum moisture at root zone. It is, therefore, needed to manage this pest more effectively by combined use of drip irrigation, suitable cultivars and mulches. Keeping this in view, the present studies were planned to observe the effect of drip irrigation, cultivars and mulches on incidence of jassid on okra.

Material and methods

The studies were carried out at Research Farm, College of Agriculture, Swami Keshwanand Rajasthan Agricultural University, Bikaner during the rainy seasons of 2008 and 2009. The experiment was laid out in Split-Split plot design and replicated three times with twenty four treatment combinations. The treatments included four levels of irrigation viz. 100 %, 80 % and 60 % ET through drip and 100 % recommended surface irrigation; two cultivars viz., Arka Anamika and Tulsi Hybrid; and Three treatments of mulches viz., control, Bui mulch (Organic mulch @ 10 tonnes /ha) and Black polyethylene (25 micron). The volume of water required under drip irrigation system was computed using following equation:

$V = Ep \times Kp \times Kc \times A \times Wp$

Where, V= Volume of water required in litre / day, Ep= Mean pan evaporation for the month in mm/day, Kp= Pan coefficient (0.7 for class A pan), Kc= Crop coefficient, A= Plant to plant x row to row spacing (0.40 m x 0.20 m), Wp= Wetting fraction (0.9)

The seeds were sown at 40 x 20 cm spacing between row to row and plant to plant in rainy season. FYM @ 200 q/ha was applied at the time of field preparation. A

uniform dose of 60 kg P_2O_5/ha through DAP, 50 kg K_2O/ha through muriate of potash and half dose of nitrogen (50 kg) through urea were applied in the soil at the time of sowing. The remaining dose (50 kg) of nitrogen through urea was applied through drip irrigation. After germination of seeds, *bui* was placed in the experimental plots @10 t/ha while black polyethylene was placed between the rows of okra. In drip irrigation, water was applied per day while in surface method water was applied at weekly interval.

The observations on number of jassid were counted by selecting five randomly plants and then tagged. Three leaves from top, middle and bottom of each plant were plucked and then counts of the jassid population from lower surface of leaves and finally calculated the average jassid population.

Results and discussion

Perusal of data in table 1 and fig. 1 showed that number of jassid per three leaves was influenced significantly by different irrigation volumes during both the years and in pooled analysis. Population of jassid was recorded maximum (5.45 /3 leaves) in surface irrigation followed by 1.0 volume of drip (4.70 /3 leaves) and minimum in 0.6 volume of drip (1.73 /3 leaves). There was progressive decrease in population of jassid from drip 1.0 volume to drip 0.6 volume. This treatment prevented excessive vegetative growth resulting unfavorable conditions of incidence of jassid. Frequent application of water maintains the soil moisture almost near to the field capacity, thereby crop did not suffer from moisture stress during growth period. Similar results were reported by Raina *et al.* (1999).

The data presented in table 1 and fig. 1 showed that during 2008, number of jassid was minimum (3.35 /3 leaves) in Tulsi hybrid as compared to Arka Anamika (3.94/ 3 leaves). Similar trend was observed during 2009, minimum number of jassid (3.74/ 3 leaves) was recorded in Tulsi hybrid whereas maximum under Arka Anamika (3.97/ 3 leaves). Pooled data indicated that minimum number of jassid (3.55/ 3 leaves) was recorded in Tulsi hybrid over Arka Anamika (3.96/ 3 leaves), however, both the cultivars were at par with each other in terms of incidence of jassid in both the years as well as in pooled data.

It is further evident that during 2008, number of jassid was minimum in bui mulch (2.64/3 leaves) followed by black polyethylene mulch (3.59/ 3 leaves) and control (4.71 / 3 leaves). Similar trend was observed during 2009. The pooled data of 2008 and 2009 exhibited that minimum number of jassid (2.69 / 3 leaves) was recorded in bui mulch whereas, maximum was under control (4.78/ 3 leaves). Low evaporation and more moisture conservation in soil which result in overall better performance of okra plant may be one of the reason of low and high number of jassid incidence on the plants. The present results are inconformity with those of Sterk and Span (1997) and Samaila (2011) who reported that straw mulch allow for better air circulation and resulted in better performance of tomato plants in field.

Table 1: Effect of irrigation volumes, cultivars and mulches on Jassid population in okra crop

Treatment	Number of Jassid / three leaves		
	2008	2009	Pooled
Irrigation levels			
Surface (1.0 V)	5.23	5.675.45	
Drip (1.0 V)	4.35	5.054.70	
Drip (0.8 V)	3.05	3.203.13	
Drip (0.6 V)	1.95	1.511.73	
SEm±	0.242	0.477	0.267
CD (P=0.05)	0.84	1.650.82	
Cultivars			
Arka Anamika	3.94	3.973.96	
Tulsi	3.35	3.743.55	
SEm±	0.274	0.315	0.209
CD (P=0.05)	NS	NS NS	
Mulching			
Control	4.71	4.854.78	
Bui	2.64	2.732.69	
Black polyethylene	3.59	3.993.79	
SEm±	0.313	0.291	0.213
CD (P=0.05)	0.90	0.840.60	

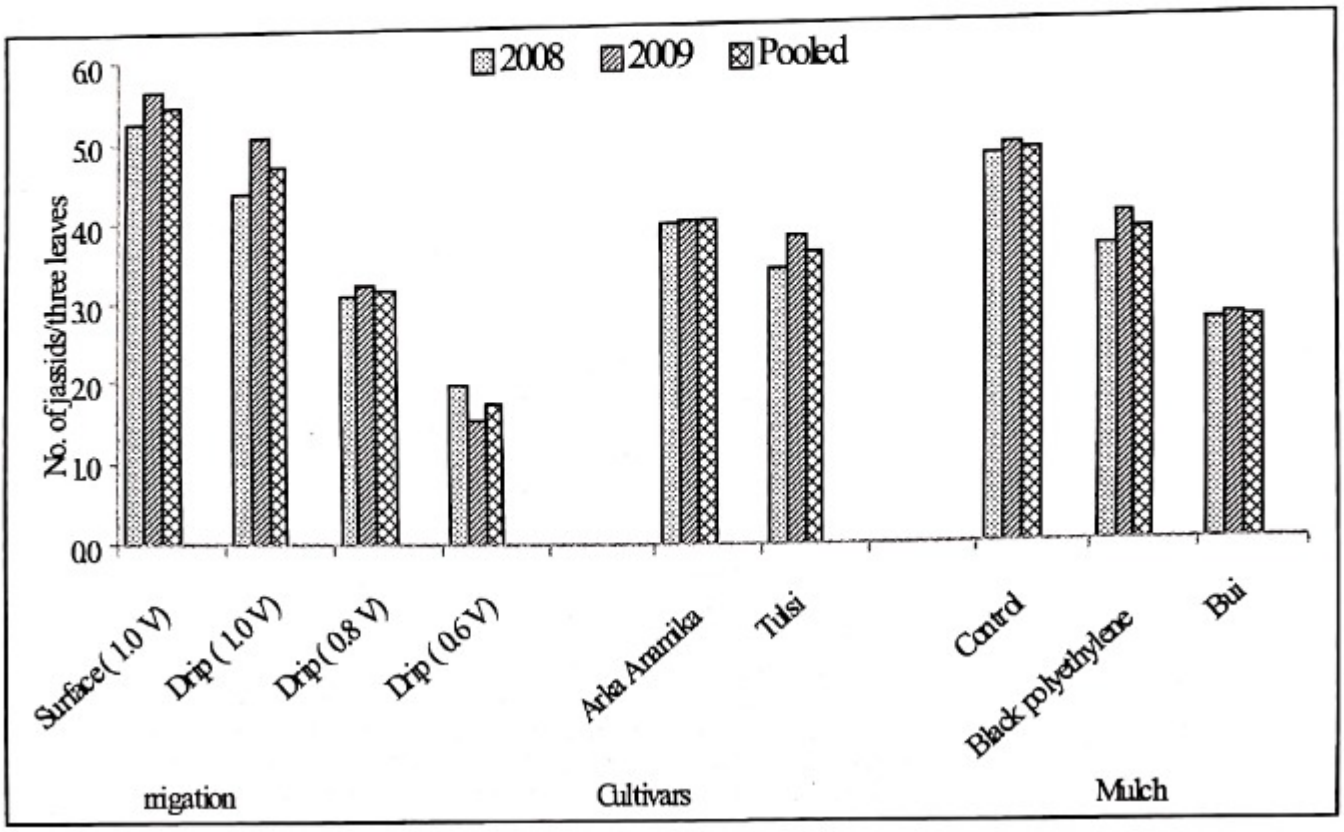

Figure 1. Effect of irrigation volumes, cultivars and mulches on Jassid population in okra crop

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