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Research Article

Effect of Abiotic Factors on Population Dynamics of Whitefly and Jassid on Bt-Cotton

Muhammad Zuhaib Safdar*, Muhammad Naeem, Muhammad Mamoon-ur-Rashid, Faisal Dhapra, Habel Parwaiz and Ghulam Murtaza

Department of Entomology, Faculty of Agriculture, Gomal University, Dera Ismail Khan, Pakistan

***Corresponding Author:** Muhammad Zuhaib Safdar, Department of Entomology, Faculty of Agriculture, Gomal University, Dera Ismail Khan, Pakistan.

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Abstract

The field study was carried out to check the effect of abiotic factors on population dynamics of whitefly (*Bemisia tabaci*) and jassid (*Amrasca biguttula*) on Bt-Cotton MNH-886, under unprotected condition. After the field study it is found that population of whitefly and jassid were maximum when the temperature was high. (11.68) of whiteflies per leaf was recorded at highest temperature (45oC) and lowest humidity (30%). Similarly, the maximum population (3.53) of jassids per leaf was recorded at maximum temperature (45oC) and lowest humidity (30%) on July 10th, 2017. The rainfall had slight impact on the population of whiteflies and Jassids. After analysis, it is concluded that maximum temperature is favourable for the surviving and development in population of whitefly and jassid but on the other hand, minimum temperature is unfavourable for these insect pests. Precipitation show effect negatively, but relative humidity was non-significant on these insect pests.

Keywords: Abiotic Factors; Population Dynamics; Whitefly and Jassid; Bt Cotton

Introduction

Cotton (*Gossypium hirsutum* L.) contributes much of the economy of pakistan [1]. It backs our material commercial enterprises. Cotton continuously a regular fiber crop will be likewise called silver-fiber to its exceptional nature [2]. Cotton utilization are going starting with garments with decorations for homes what is more drugs. Pakistan stands 5th greatest producer also 4th real cotton client for those globe and the major exporter from claiming cotton yarn [3]. Cotton may be growed In 3 million hectares to pakistan Also its stake On gdp will be 1. 5%. It contributes 7.0% on esteem included on agribusiness [4].

Around an assortment of reasons of low yield, those extent from claiming insect-pests, which harm those cotton crop starting with sowing should maturity, assumes a paramount part. Those insect-pests make 5-10% misfortunes with respect to a normal be that as in extreme attack, insect-pests camwood cause overwhelming qualitative and quantitative misfortunes fluctuating starting with 40-50% [5]. There would diverse bother control tactics in which varietal safety may be monstrous without insecticidal spray requisition [6,7].

Insect pests of cotton complex is isolated under two categories; sucking and chewing insect pests. Imperative sucking insect pests need aid whitefly (Bemisia tabaci), jassid (Amrasca biguttula), thrips (Thrips tabaci) also aphid (Aphis gossypii) which need aid also designated concerning illustration key pests making practically of the harm to cotton crop. Cotton whitefly harms those plant toward sucking cell sap bringing about half diminishment done boll preparation [8] and go about as a vector for leaf beet twist infection ailment (CLCV) [9], which is debilitating our cotton-based economy. It demonstrations concerning illustration a sole vector from claiming more than 100 plant viruses, which reason maladies to a significant number business harvests in distinctive parts of the reality [10].

Overwhelming infestation might lessen plant vigor and growth, make chlorosis and uneven aging for bolls. Its immediate nourishing induces physiological issue bringing about shedding for adolescent fruiting parts. Its nymph's process honeydew, looking into which dark dingy shape grows, diminishing the photosynthetic abilities about plants. Similarly, jassid is also An famous sucking pest of cotton plant [11]. Whitefly Furthermore jassid populaces need aid typically emphatically corresponded with those temperature same time negative with relative moistness. To separate

utilization of insecticidal sprays need not main initiated those imperviousness issue for these pests as well as need-dirtied nature's domain alongside different wellbeing dangers [11,12]. Comprehension those groups choice conduct technique and the impact of different morphologic plant characters is a critical prerequisite to creating the bother management methodology.

Cotton Jassid, *Amrasca biguttula* will be a standout amongst the greater part genuine sucking pest about cotton for india making diminishment for yield to an degree about 20 percent. Nymphs what's more grown-ups suck in sap starting with the under surface of the abandons furthermore making descending curling, yellowing what's more reddening about leaf beet lamina which outcomes after the fact clinched alongside container smolder what's more clinched alongside extreme cases abandons dry and drop down. A great cotton crop with negligible bother assault acquires prosperity, same time extreme frequency acquires hopelessness. Consequently, bother may be a critical determinant of the thriving of the farmers. Those learning something like occurrence from claiming bother throughout the cropping season Also its workable Progress help previously, planning bother management methodologies.

Objective

Keeping in view the present studies were carried out to study population dynamics of whitefly and jassid on cultivar of cotton MNH-886 (Bt-cultivar) in agro climatic conditions of Dera Ismail Khan, Pakistan.

Materials and Methods

A field study was carried out during the months of July and August (2017) at Department of Entomology, Faculty of Agriculture, Gomal University, Dera Ismail Khan, Pakistan. The cotton Bt-variety MNH-886 was grown in the observation plot with recommended agronomic package of practices. Observations on the number of nymphs and adults of whiteflies and jassids were recorded 9 times on weekly basis from three leaves per plant selected from top, middle and bottom on 30 randomly selected plants.

Weather data (temperature, relative humidity, wind speed and rainfall) of concerned dates was obtained and compared with the fluctuating population of jassids and whiteflies.

Results and Discussion

The data presented in Table 1 show that the increasing temperature positively affected the population of whiteflies and jassids on cotton. The maximum population (11.68) of whiteflies was recorded at highest temperature (45°C) and lowest humidity (30%). Similar trend of jassid population build up was recorded.

Economic threshold levels of different insect pests of cotton crop

Insect Pests	Economic Threshold Level
Jassid	1 adult/nymph per leaf
Whitefly	5 adult/nymph per leaf
Thrips	8-10 per leaf
Aphid	10/leaf or on visible damage
Mite	15/leaf or on visible damage
American boll worm	5 brown eggs or 3 larvae/plant
Spotted bollworm	3 larvae/plant
Pink bollworm	5% damage or presence of larvae in boll
Army bollworm	Just at appearance

Table a

The maximum population (3.53) of jassids was recorded at maximum temperature (45°C) and lowest humidity (30%) on July 10th, 2017. The rainfall had slight impact on the population of whiteflies and Jassids. In case of no rainfall, favourable environmental conditions like high temperature and low humidity were found for the population build-up of whiteflies and jassids.

Comparable effects need been news person by distinctive researchers Gogoi., *et al.* [13]; Murugan and Uthamasamy [14] Also Panicker and patel [15] accounted that meteorological parameters assume a paramount part in the number variance from claiming sucking insect pests. Those available discoveries are in understanding for the discoveries of Umar., *et al.* [16] also Bishnol., *et al.* [17] who accounted that jassid number expanded with most extreme temperature.

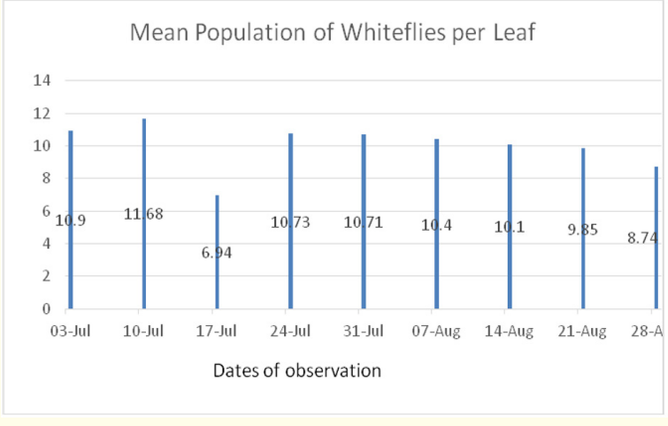

Figure 1: Population dynamics of whiteflies on cotton crop in agro-climatic conditions of Dera Ismail Khan during 2017-2018.

Observation Dates	Weeks	W. flies/leaf	Jassids/leaf	Temperature (°C)		R. humidity (%)		Wind speed Km/hr	Rainfall (mm)
				Max	Min	Max	Min		
03-July	1	10.9	3.50	42	26	34	27	4.08	-
10-July	2	11.68	3.53	45	24	30	27	3.25	-
16-July	-	-	-	-	-	-	-	-	34
17-July	3	6.94	3.25	38	22	39	32	2.75	-
24-July	4	10.73	3.44	40	24	40	27	2.66	-
25-July	-	-	-	-	-	-	-	-	16
31-July	5	10.71	3.46	40	22	40	32	2.50	-
07-August	6	10.4	3.42	40	25	58	141	2.42	-
14-August	7	10.1	3.40	36	25	46	41	3.12	-
21-August	8	9.85	3.22	32	22	44	30	1.88	-
26-August	-	-	-	-	-	-	-	-	80
28-August	9	8.74	3.12	34	22	50	40	2.84	-

Table 1: Population dynamics of whiteflies and jassids on cotton crop in agro-climatic conditions of Dera Ismail Khan during 2017-2018.

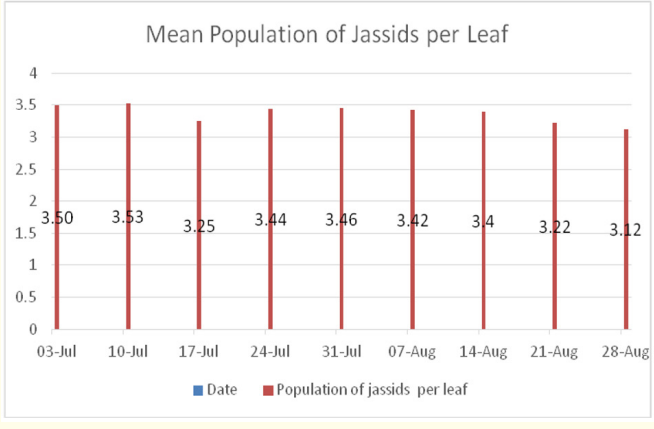

Figure 2: Population dynamics of jassids on cotton crop in agro-climatic conditions of Dera Ismail Khan during 2017-2018.

Conclusion

On the basis of obtained results, it is concluded that the increasing temperature positively affected the population of whiteflies and jassids whereas relative humidity and rainfall negatively affected the population of the tested insects. The abiotic factors did not play significant role in mediating population dynamics of these pests.

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