Research Article

Populace tendency of Dubas bug-*ommatissus lybicus* (hemiptera: tripiduchidae), on different date palm varieties and it's managment, in Panjgur-Balochistan

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Abstract

The analysis/ trial was conducted to check the populace pattern of Dubas bug-*ommatissus lybicus* (hemiptera: tripiduchidae) related characteristic adversaries and substance control on date palm in the year of 2018 at Agriculture Research Station, Panjgur Balochistan. Five assortments Haleni, Kahraba, Muzati, Rabai and Sabzo were chosen to watch their reaction to Dubas bug and further to check the impact of synthetic against the Dubas bug. In this study, the treatments were Acetamiprid (30g/30 liter water) Neem +Detergent (3% + 1%), Detergent (5%) and water (control). As indicated by our perceptions the Muzati and Rabai assortments with populace (8.51 bugs handout 1 and 9.23 bugs pamphlet 1) were to some degree safe than different assortments while the Kahraba and Sabzo were vulnerable with most noteworthy populace 14.96 bugs flyer 1 and 12.28 bugs pamphlet 1, separately. Among the compound control the number of inhabitants in Dubas bug in Acetamiprid was 17.13 bugs flyer 1, Neem +Detergent (19.86 bugs pamphlet 1), Detergent (21.95 bugs handout s1) and in charge (24.47 bugs flyer 1). It was presumed that Acetamiprid was giving acceptable outcome contrasted and other. In our analysis with respect to regular foe Jumping Spider (*Sitticus* species) was noted benefiting from the Dubas bug.

Keywords: Dubas bug; Date palm varieties; Dubas bug's management; Dubas bug's populace tendency

Introduction

The date palm (*Phoenix dactylifera* L.) has a place with the family arecaceae all together arecales. The specific inference of the plant isn't resolved anyway date palm cultivating has been accounted for 4000 B.C. in Southern Iraq. However, some student of history says that its source is old Egypt and there is accord

that the essential type of date palm development harmonized with the most established advancement and began in North-East Africa [1]. The half of the whole date's items in Pakistan originates from Balochistan. The Mozatiis date palms assortment having great quality and amount of creation planted in the territory because of its appeal in the global market. The Pakistan Government define a strategy to empower for more date palm creation in Balochistan Province as its development and appropriate administration improve financial status of the rancher as well as the nation and the area. In other setting, the date palm creation had been agreeable less consistently. As per the G.O.B. (2005), in Balochistan the creation of dates had lessened about 37.5% between 1994-95 and 2004-05. It is accepted that the primary driver in its low creation is the Dubas bug (*Ommatissus lybicus*), privately called "sherago infection" [2]. The numerous maladies and bugs have influenced the date palm creation in Panjgur-Balochistan. The Dubas bug is considered dangerous bug of numerous cultivars of date palm in Panjgur since 1999. In North Africa, Iran, Spain and in numerous Arab nations, it has been affirmed making extreme wounds on numerous cultivars of date palm. In Arab nations the 30% date creation is affected by irritation and maladies [3]. Dubas bug (*Ommatissus lybicus*), have a place with request and family (Homoptera: Tropiduchidae) that straightforwardly cause damage to plant by taking care of, cell sap sucking and discharges honeydews on surface of leave and frond. It's in a roundabout way damage is photosynthesis and breath process decrease leaving decrease in yield amount, quality, tree shortcoming and passing [4]. Dubas bug's life cycle remembers for two ages, original (spring) and second (summer) in a year which are finished absolutely in palm. The Dubas bug whole life time restrained on the date palm. Dubas bug

hurts phloem and harm organic product stalk and the flyer of date palm by separating the phloem juice. As a rule all date palm cultivars are swarmed by Dubas bug assault on Medjhool is high as related to Deglet Noor dependent on honeydew emission. This risky nuisance may offer up to 50% financial loss to date palm developing ranchers. Attractive cultivars of Panjgur Sabzoo and Kehraba are almost certain perceived verminous and powerless by unsafe bug Dubas bug when contrasted with Jan Sore and Mozavati. Around 25–60 % misfortune is brought about by Dubas bug in the yield of Kehraba assortment [5]. The Dubas bug is effectively found on natural products packs and leaves of palm tree during the distinctive advancement stages. Though, in high tainted plants the nectar's beads dew containing dust are found on upper surface of old and new leaves and branches. The date palm's suckers are bearer of Dubas bug and containing eggs of Dubas bug. The predominance and amount of date is endured by harm of Dubas bug. The eggs can be saved on the date palm's all green parts barring the natural products with the dominant part on the handouts, especially on the upper surface [6]. Dubas bug control is discretionary when there is a high populace happening for control of Dubas bug a considerable lot of synthetic medications had been applied, including ground and ethereal applications. Toward the beginning of an age treatment are applied for Dubas bug control (right off the bat in the period of April or from the get-go in August month). In 1965, with use of dichlorvos (DDVP), in Iraq had given reasonable administration of Dubas bug. Suppressing the Dubas bug populace by thiamethoxam 1g was progressively proficient by infusing it to per palm [7]. Plant root bug sprays are for the most part noted less perilous to individual and significant bugs. Likewise there are diminished measure of odds of focused vermin to create flexible. Vegetal pesticides, for example, harsh gourd

leaf extricate, Bakaine, Neem oil are habitually successful sucking bugs of cotton crop. Neem items had been believed to be viable nearly against 200 types of creepy crawlies. About 30-70 % mortality of Dubas bug was seen by Neem treatment details with 1, 5 and 15 % azadirachtine [8].

Materials and methods

The trial preliminary "Populace Trend of Dubas Bug, related regular adversaries and synthetic control on date palm in the year of 2018" was done at Agriculture Research Station Panjgur-Balochistan to check the impact of various synthetics on Dubas bug populace. Further examinations were directed to check populace pattern of Dubas bug on the various assortments of Date palm. In addition, populace pattern of various normal adversaries of Dubas bug were noted. But Jumping creepy crawly, the quantity of other common adversaries were exceptionally less so it was impractical to record their information. The analysis was spread out in Randomized Complete Block Design (RCBD) for date palm trees. All the agronomic contemplations were applied consistently. There were four medications for substance control. Every treatment was imitated multiple times. One assortment was chosen for synthetic application, the concoction was showered when the Dubas bug populace came to financial limit level. For populace pattern of Dubas bug, five assortments of date palm were chosen, so as to locate the safe assortment. Medium size and mature (seven to eight years old) trees of date palm were chosen for the experiments.

Populace density

The information for the populace thickness of Dubas bug was recorded from four parts of one tree, from four sides of each tree (east, west, north and south). From one branch; three handouts were chosen from base, center and parallel from every frond/branch, around 12 flyers of each tree. The information was gathered week after week. Little size tree,

matured around seven to eight years of age were chosen. For Chemical control populace of Dubas bug were recorded 24 hours before splash and 24 hours, 48 hours, 72 hours and 15 days after shower. Just Kahraba assortment was chosen for substance splash. The shower was finished by little hand siphon sprayer.

Populace pattern of jumping spider

To break down the number of inhabitants in regular foes on date palm against the Dubas bug, just bouncing arachnid as common adversary was distinguished and the populace was determined from every replication. For computation the quantity of regular foes, four fronds/branches were chosen from each date palm tree; number of common foe and Dubas bug from four parts of one date palm tree were determined.

Analysis of data

Information was broke down by performing examination of fluctuation (ANOVA) utilizing Statistix 8.1 PC programming. Means were determined by utilizing the least noteworthy contrast (LSD) test at likelihood of $p < 0.05$.

Results

The near reaction of various date palm assortments were tried against the Dubas bug as appeared in (Table 1). All the assortments of date palm were invaded by Dubas bug. Dubas bug showed up in first seven day stretch of April and stayed dynamic up to a week ago of June. In by and large time of 13 weeks the quantity of dubas bugs went from 0.87 to 26.27 bugs handout 1, the temperature recorded was (max. 41°C, smaller than normal 30°C) and mugginess recorded during this period was (max. RH 32%, min. RH 30%). The information shows that mean least number of Dubas bug was recorded in Muzati was with mean estimation of 8.51 bugs pamphlet 1 followed by Rabai (9.23 bugs handout 1), while in Haleni the mean populace of Dubas bug was 10.45 bugs flyer 1 and most elevated number of Dubas bug

was recorded in Kahraba with mean estimation of 14.96 bugs pamphlet 1. The number of inhabitants in Dubas bug was expanding and diminishing with deference various weeks. The least populace was recorded 1.68 bugs pamphlet 1 on 27th of June followed by 4th of April (1.81 bugs handout 1), while the most elevated populace of Dubas bug was recorded on 9th of May with mean estimation of 20.13 followed by 19.65 bugs flyer 1 on 16th of May. The temperature was continually raising and dampness was diminishing till the finish of the Dubas bug lifecycle as appeared in (Fig. 1 & 2).

The populace thickness of characteristic foes of Dubas bug is referenced in (Table 2). The main common adversary was found in the examination zone benefiting from Dubas bug was a predator, Jumping Spider (*Sitticus* species). The number of inhabitants in regular foes was recorded on five assortments of date palm. The information shows that populace of hopping creepy crawly was practically same on all the five assortments of Date palm. The most elevated mean populace of bouncing creepy crawly was recorded on Rabai (2.83 insects per tree) trailed by Sabzo (2.80 arachnids per tree). While in Kahraba, Muzati and Helani the number of inhabitants in Bouncing insects was 2.77 and 2.75 and 2.75 bug's tree1 respectively. The number of inhabitants in hopping bug had enormously changed in various weeks. The most minimal populace of hopping bug was recorded on 4th of April (1.81 creepy crawlies per tree) trailed by 11th of April (2.00 bugs per tree) while the most noteworthy populace of Jumping arachnid was recorded on 27th of June (4.18 bugs per tree).

Consequences of different medicines and their impacts on populace of Dubas bug are referenced in (Table 3). The information shows the mean number of bugs before splash and post-shower information was gathered following 24 hour, 48 hour, 72 hour

day and 2 weeks. The mean number of Dubas bug ran from 6.31 to 26.01 When contrasted with control. In over every one of the 2 weeks time frame the most minimal mean bug populace was found in the treatment acetamiprid (17.37) trailed by neem oil with cleanser (19.86). While the number of inhabitants in Dubas bug in plants treated with cleanser was 21.65. Where in charge, the nuisance populace was most elevated (24.47). Least bug populace was found following 2 weeks of splash in acetamiprid (6.31) while the most elevated vermin populace around 26.0 was found in charge plot in unequaled interims.

Discussion

The current investigation with respect to populace pattern of Dubas bug, related normal adversaries and substance control on date palm were concentrated out at Agriculture Research Station Panjgur Balochistan during 2018. The watched outcomes are examined as under. The outcomes with respect to the number of inhabitants in thickness of Dubas bug in various five driving assortments (Kahraba, Sabzo, Rabai, Haleni and Muzati) were tried so as to discover the vulnerability. These outcomes concurred with [9] who detailed that increasingly nectar dew was emitted from Kahraba as contrast with Muzati and expressed that nectar dew amount dropping was not the same as various assortments. The [10] revealed that Dubas bug were raised on five distinct assortments of date palm, the productiveness and improvement time was diverse on various verities. He reasoned that Muzati assortment was safe than Zahadi. The diverse populace of bouncing creepy crawly was found on all assortments. Our discoveries are as per aftereffects of [11] in which it was accounted for that the hopping bug was probably the best predator to control Dubas bug.

Table 1. Mean seasonal population of Dubas Bug on different Date palm varieties

Treatm-ents	4 th April	11 th April	18 th April	25 th April	2 nd May	9 th May	16 th May	23 rd May	30 th May	6 th June	13 th June		27 th June	Mean for treatments
Kahraba	2.30efg	9.62w	16.48kl	20.25ef	23.45c	26.27a	25.29b	20.53e	16.47l	13.64p	11.46tj	6.52za	2.22efgh	14.96 ia
Sabzo	2.36efg	7.42y	12.31rs	16.50kl	19.40g	22.43d	21.83d	18.35hi	14.86no	11.40tu	7.48iij	3.26d	1.99fghi	12.28 ib
Rabai	1.66ghi	5.85ab	9.37iiv	12.52qrs	14.46o	17.75ij	16.96jkl	12.72qrs	10.48v	8.57x	5.40b	2.76def	1.47hij	9.23d
Haleni	1.35ij	7.05yz	9.53w	13.30pq	17.26jk	19.55fg	18.83gh	15.66m	13.64p	9.44w	5.67b	2.78de	1.86ghi	10.45c
Muzati	1.36ij	5.53b	8.31x	11.03uv	13.04pqr	14.63no	15.36mn	13.66p	12.03st	8.34x	4.36c	2.11efhgi	0.87j	8.51e
Mean	1.81k	7.09l	11.20g	14.72e	17.52c	20.13a	19.65b	16.18d	13.49f	10.28h	6.87l	3.49j	1.68k	
Kahraba	2.30ef ig	9.62W	16.48kl	20.25e if	23.45c	26.27A	25.29b	20.53e	16.47L	13.64p	11.46Tj	6.52zA	2.22Efgh	14.96A
Sabzo	2.36ef ig	7.42Y	12.31rs	16.50Kl	19.40g	22.43D	21.83d	18.35hi	14.86No	11.40tiu	7.48iy	3.26d	1.99fGhi	12.28B
Rabai	1.66g ihi	5.85Ab	9.37W	12.52 Qr is	14.46o	17.75i ij	16.96jkl	12.72q irs	10.48 V	8.57X	5.40b	2.76de if	1.47Hij	9.23d
Haleni	1.35ij	7.05Yz	9.53W	13.30p iq	17.26jkl	19.55Fg	18.83g ih	15.66m	13.64P	9.44W	5.67b	2.78de	1.86Ghi	10.45c
Muzati	1.36ij	5.53B	8.31X	11.03Uv	13.04p iqr	14.63No	15.36m in	13.66p	12.03St	8.34X	4.36c	2.11ef ihgi	0.87j	8.51e
Mean	1.81k	7.09L	11.20g	14.72e	17.52c	20.13A	19.65b	16.18d	13.49F	10.28h	6.87l	3.49j	1.68K	

Mean followed by similar letters within the column and rows are not significantly different at 5% level of probability

LSD value of treatment= 0.21

LSD value of time interval = 0.35

LSD value of interaction= 0.79

Table 2. Mean seasonal population of jumping spider on different date palm varieties

Treatments	4 th April	11 th April	18 th April	25 th April	2 nd May	9 th May	16 th May	23 rd May	30 th May	6 th June	13 th June	20 th June	27 th June	Mean for Treatmnet
Kahrab a	1.56t	2.03o p	2.10n o	2.24n o	2.47lm	2.75i j	2.95hj	2.99Gh	3.10fg	3.10fg	3.40de	3.57cd	3.77bc	2.77a
Sabzo	1.69st	2.04o p	2.10n O	2.21n o	2.21no	2.50j k	2.43mn	2.67i J	3.23ef	4.50a	3.24df	3.43de	4.03ab	2.80a
Rabai	1.99pq	2.11n o	2.11n O	2.20n o	2.20no	2.56j k	2.45mn	2.40Mn	3.01gh	3.25ef	3.72bc	4.34a	4.45a	2.83a
Haleni	1.84rs	1.86rs	2.00p Q	2.40m n	2.48kl	2.00pq	2.38mn	3.12f G	3.29de	3.36de	3.35de	3.47de	4.20ab	2.75a
Muzati	1.56t	2.00p q	1.86rs	2.00p q	2.00pq	2.42mn	2.23no	2.99Gh	3.10fg	3.36de	3.49de	4.11ab	4.48a	2.76a
Mean	1.81i	2.00hi	2.04hi	2.21g h	2.27fg	2.45f	2.49f	2.85E	3.14d	3.51c	3.44c	3.79b	4.18a	

Mean followed by similar letters within the column and rows are not significantly different at 5% level of probability

LSD value of treatment= 0.14

LSD value of time interval = 0.22

LSD value of interaction= 0

Table 3. Effect of Chemicals on mean population of Dubas bug on date palm

Treatments	Before	24 hour	48 hour	72 hour	2 week	Mean
Acetamiprid	25.46a	22.33b	22.02b	18.80c	6.31e	17.37d
Neem+Detergent	26.01a	23.37ab	21.62b	20.3b	16.13d	19.86c
Detergent	25.53a	24.11a	22.40b	22.1b	19.15b	21.95b
Control	25.83a	26.00a	26.00a	25.56a	20.33a	24.47a
LSD	2.20	3.24	3.04	2.54	2.27	2.05

Mean followed by similar letters within the column are not significantly different at 5% level of probability

Figure 1. Average minimum and maximum temperature over the year

Figure 2. Average humidity over the year

Further [12] referenced that creepy crawlies were watched benefiting from Dubas bugs. In analyze the treatment of Acetamiprid was discovered powerful in lessening the quantity of Dubas bug our finding are upheld with finding of [13] that neo nicotinoid bug sprays are compelling diminishing Dubas bug populace. Further about consequences of Neem + cleanser. Our finding don't concurred with [8] in regards to utilization of plant oils can fill in as another to substance pesticides. Neem oil applied @ 2 % focus against first, second, third and fifth instars

fairies of southern green stink bug (*Nezara viridula* L.) caused 4.08, 37.0 and 60.8 percent mortality at seventh day after treatment. Percent mortality of these formative stages at fourteenth day of post application was 60.9, 59.2 and 45.6, individually. In later, branches of plant insurance and ranchers are generally reliant on ground and elevated showering of compound pesticides, for example, fenitrothion and imidacloprid (98% ULV), where life phases of Dubas bug, nearness of characteristic adversaries and pervasion level

of the irritation invasions isn't considered. About the evaluated amount of concoction was against Dubas bug control since, 2004 was around 16808 and 12700 liters by flying and ground shower separately with overwhelming expense of 13.89 and 14.65 million individually [14] detailed that overwhelming use of wide range lingering bug sprays after some time represents the danger of resurgence of optional vermin and obstruction will be created by pests. Additionally it will hurt the useful creepy crawlies,

Summary

The trial was led to discover the populace pattern of Dubas bug, related common adversaries and compound control on date palm at Agriculture Research Station Panjgur Balochistan. Five unique assortments Kahraba, Sabzo, Haleni, Rabai and Muzati were seen to discover the varietal reaction against Dubas bug and four medications (Acetamiprid, Neem oil + Detergent, Detergent and control) were utilized to check adequacy to thump down Dubas bug populace and five clingy traps of various hues (yellow, darker, blue, green, and white) were additionally used to discover the fascination of Dubas bug to these hues. Information was gathered with various time interims. Information as to date palm assortments reaction to Dubas bug. Five distinct assortments (Kahraba, Sabzo, Haleni, Rabai, and Muzati) were watched. From the outcome noteworthy contrast was seen among these assortments. The development of Dubas bug was seen from a week ago of March till a week ago of June, the populace was expanding till on all assortments till sixteenth May, after that the number of inhabitants in Dubas bug was watched diminishing till 27th of June. From mean of all week it is seen that the most reduced nuisance populace was found on Muzati (8.51), trailed by Rabai (9.23) in Haleni (10.45) and Sabzo was invaded with mean

number of (12.28). While the most elevated populace of Dubas bug was seen on Kahraba with mean pervasion of 14.46. There was non-critical contrast among Rabai and Haleni while the importance results were found among Muzati and Kahraba. The Muzati and Rabai were not vulnerable as contrast with Haleni, Sabzo and Kahraba which were seen as progressively defenseless to Dubas bug. In look into zone there were no other common adversaries to control the pervasion of Dubas bug with the exception of Jumping Spider. As from result it is discovered that the number of inhabitants in Jumping Spider was expanding with expanding of temperature. The most noteworthy number was seen on 27th of June (4.81) trailed by twentieth June (3.79). On fourth April most reduced populace was 1.81. There was non-noteworthy distinction in bouncing arachnid populace on various assortments. The information of all mean if there should be an occurrence of concoction treatment there were critical distinctive among the impact of different medications, the least mean populace of Dubas bug was found on plants treated with Acetamiprid (17.37) and the most elevated number of Dubas bug was found in the plants treated with cleanser (21.95). Most reduced number of Dubas bug found following 2 weeks was (6.31) and most noteworthy number was found on 24 hours before splash was 26.01.

Conclusion and recommendations

According to findings the result recorded that, the variety 'Muzati and Rabai' showed resistance against the infestation of Dubas bug, are recommended to be grown in Panjgur. Acetamiprid was effective against the Dubas bug. We need to encourage natural enemies to suppress the pest population of Dubas bug.

Authors' contributions

Conceived and designed the experiments: S Ahmed, AS Khetran & ZA Mastoie, Performed the experiments: S Ahmed & TA Mastoie, Analyzed the data: S ahmed, AS

Khetran & ZA Mastoie, Contributed reagents/ materials/ analysis tools: N Jomezai & A Rouf, MA Kakar, Wrote the paper: BH Mastoie & B Baig.

References

1. Rashida A (2003). A time for date H.E.J. Research Institute of Chemistry University of Karachi dated 12: 10.2003 Daily Dawn.
2. GOP (2008). Dates marketing strategy. Pakistan Horticulture Development & Export Board, Islamabad, pp 1-24.
3. Loutfy I & Juhany EI (2010). Degradation of date palm trees and date production in Arab Countries: causes and potential rehabilitation. *Aust J Basic Appl Sci* 4: 3998–4010.
4. Wilson MR (1987). The Auchenorrhyncha (Homoptera) associated with palms. In: Wilson, MR and LR Nault. (eds). Proceedings of the second International Workshop on Leafhoppers and Plant hoppers of Economic Importance, 28 July-1 August, 1986. Wallingford, UK: CAB Inter pp 327-342.
5. Makhdum AH & Shah A (2004). Date palm under threat in district Panjgur, Balochistan. Combine tour report of Cabi International, regional bioscience centre Pakistan and Department of Agriculture Balochistan, Pakistan, pp 5.
6. Hussain AA (1963). Biology and control of the dubas bug, *Ommatissus lybicus* De Berg. (Homoptera: Tropiduchidae) infesting date palms in Iraq. *Bull Entomol Res* 53: 737-745.
7. Al-Azawi AF (1986). A survey of insect pests of date palms in Qatar. *Date Palm J* 4: 247- 266.
8. Al-Mahmooli HIS, Deadman ML & Alwahabi AK (2005). Evaluation of Azadirachtin a formulation for the control of dubas bug in Oman. The BCPC Int. Congr. *Crop Sci Technol* 551-556.
9. Shah A, Zai A, Rafi MA, Mehmood SA, Aslam S & Chaudhary MJ (2016). Quantification of honeydew production caused by dubas bug on three date palm cultivars. *J Entomol Zool Stud* 4: 478-484.
10. Mahmoudi M, Sahragard A & Ghadamyari M (2015). Demographic analyses of resistance of five varieties of date palm, *Phoenix dactylifera* L. to *Ommatissus lybicus* De Bergevin (Hemiptera: Tropiduchidae). *J Agric Sci Tech* 17: 263-273.
11. Mokhtar MA & Nabhani SSA (2001). Using the production of honeydew as indication to estimate the population of dubas bug *ommatissus lybicus* in the date palm grooves in Oman. Annual Report of Entomology, Jimah Research Station Entomology Laboratory.
12. Shah A, Mohsin AU, Naeem M, Bodlah I & Hafeez Z (2012). Dubas Bug, *Ommatissus lybicus* (Tropiduchidae: Hemiptera) A new record from Panjgur, Balochistan, Pakistan. *Pak J Zool* 44: 1765-1769.
13. Arbabtafti R, Sheikhigharjan A, Gharalari AH, Damghani R, Tajbakhsh MR & ArabJafari KM (2014). Drenching efficacy of imidacloprid and thiamethoxam against dubas bug, *ommatissus lybicus* (Hem: Tropiduchidae). *Egypt Acad J Biolog Sci* 6: 43–52.
14. Obeng-Ofori D (2007). The use of botanicals by resource poor farmers in Africa and Asia for the protection of stored agricultural products. *Stewart Posthar Rev* 3: 1-8.