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Effect of nitrogen and potassium fertilizations on the population size of *Parlatoria blanchardii* infesting date palm trees at Luxor governorate, Egypt.

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Abstract

The aim of this study was to determine the impact of certain levels of nitrogen and potassium fertilizations on the population density of *Parlatoria blanchardii* (Targioni- Tozzetti) infesting seedy Balady date palm leaflets at Esna district, Luxor Governorate during the two years of (2011/2012 and 2011/2013) as follows:
Concerning, the nitrogen fertilizer, the results showed that the statistical analysis of the data revealed significant differences among the three nitrogen fertilization levels, during the two successive years. Generally, significant increase in insect population size was shown in all months with the increase of nitrogen level, during the two years. Date palm trees received 1.8 kg/tree/year of nitrogen fertilizer, harboured significantly the maximum mean population density of this insect (20.3 and 24.7 individuals per leaflet), followed by those received 0.9 kg/tree/year (17.5 and 19.3 individuals per leaflet), during the two years, respectively. However, trees had no nitrogen fertilizer received the lowest mean number of population (14.7 and 16.8 individuals per leaflet) during the two successive years, respectively. Regarding, the potassium fertilizer, the statistical analysis of data resulted highly significant differences among the three potassium fertilization levels, during the two successive years. Results proved that the increase of potassium rate decreased the mean of population density of this insect. The untreated trees (zero kg/tree/year) of potassium fertilizer, recorded the highest infestation reaching (14.8 and 16.88 individuals per leaflet) for two seasons. While, the treatment (3 kg/tree/year) of potassium fertilizer, reported lowest infestation reaching (9.8 and 11.8 individuals per leaflet) during 2011/2012 and 2012/2013 years, respectively. Generally, it could be concluded from the current investigation that the lowest infestation was found on date palm tree treated with zero rate of nitrogen and 3 kg/tree/year of potassium. While, the mean highest infestation was observed under 1.8 kg/tree/year nitrogen and zero rate of potassium.

Finally, this work may add some information to be used in integrated pest management programs for controlling Parlatoria date scale insect, *P. blanchardii*.

Key words: *Parlatoria blanchardii*, date palm trees, nitrogen and potassium fertilizations.

Introduction

Among several pests, infesting date palm trees, Parlatoria date scale insect, *Parlatoria blanchardii* (Targioni-Tozzetti) is considered as a major pest. At high level of infestation with this scale insect, remarkable damage occurs, resulting in early leaves drop and yield reduction **(El-Said, 2000)**. Great damages can be done by this scale insect resulting from sucking the plant sap that give low rates of photosynthesis and respiration which leads to curling, yellowing, dropping to leaves and subsequently, cause considerable qualitative and quantitive yield losses and also marketing value of the fruits. A characteristic symptom of infestation by *P. blanchardii* is the appearance and accumulation of its scales on attacked palm parts **(El-Sherif *et al.*, 2001 and Blumberg, 2008).**

The success of herbivores insect populations is influenced by many chemical and physical factors attributes to their host plants. Although unifying theories relating plant characteristics to the success of herbivores insects are rare, it is widely accepted that scarcity usable potassium compounds in the diet of many insect species is one of the major factors limiting their growth, development and reproductive success **(White, 1978).** Nitrogen may influence semichemicals and nutritional values of plants and also behavioral characteristics of herbivores **(Bentz *et al.*, 1995).** In host-plant, the nitrogen content is generally considered as an indicator of food quality and a factor affecting host selection by herbivores **(Mattson, 1980).**

The high rate of nitrogen fertilizer significantly increased the number of egg masses deposited by *Ostrinia furnacalis*, on maize leaves **(Chu and**

Horng, 1994). Khattak *et al.* (1996) concluded that application of Nitrogen alone increased the aphid infestation. **Kumar *et al.* (1998)** concluded that mustard aphid infestation increased with increasing level of Nitrogen. Also, they recorded maximum aphid infestation at high level of Nitrogen. **Bioca and Alonso (2000)** stated that the life cycle of insects increased in the presence of potassium. **Hulesman *et al.* (2000)** found that there were significant negative correlations between the total pest population and potassium level in the soil in sweet potato crops.

Nitrogen was found to modify the plant nutrition and reduce the resistance against aphids in cotton, **(Cisneros and Godfrey 2001). Parihar and Upadhyay (2001)** mentioned that the increasing of k fertilization rates resulted in decrease in leafhoppers and mites in potato crops. **Salman *et al.* (2007)** stated that the population density of *Aphis craccivora* increased significantly with an increase of nitrogen fertilization levels.

Little informations were available in the literature concerning the effect of nitrogen and potassium fertilizations on the population size of *Parlatoria blanchardii* infesting date palm trees. Therefore, the present work was carried out to determine the impact of certain levels of nitrogen and potassium fertilizations on the population density of *P. blanchardii* infesting seedy Balady date palm leaflets.

Materials and Methods

Three rates of nitrogen and potassium fertilizations, no fertilizations, recommended amounts and double the recommended amounts were applied. These rates were added to date palm trees of seedy Balady variety in an orchard to study their effects on the population density of *P. blanchardii* during two successive years of (2011/2012 and 2012/2013).

Nine date palm trees representing three levels of fertilizer, level three trees for each level for both nitrogen and potassium fertilizations were randomly chosen for this study. These trees were similar nearly in vegetative growth such as size and age. They also were labeled and received the normal agricultural practices, without any chemical control treatments through the present investigation. The soil of the experimental field was sandy in texture, the sample of soil were taken at zero to 90 cm depth and transferred to the central laboratory for Chemical Analysis, Horticulture Research Institute, A.R.C, Ministry of Agriculture in Giza. The physical and chemical analyses of soil are shown in Table, 1.

1- Fertilizers used:

1.1- Nitrogen fertilizer:

Nitrogen in form of ammonium nitrate (33.5% N) was used at three levels, zero, 0.9 and 1.8 kg/tree/year, at three equal doses. The first dose was added in early March, May and July. In addition, all date palm trees also received the recommended rates of phosphorus and potassium fertilizations. Phosphorus fertilizer (in form of calcium super phosphate 18.5% P_2O_5) was used with a rate of one kg/tree/year at single dose in November , while, potassium fertilizer (in form of potassium sulfate 24% K_2SO4) was added at rate, 1.5 kg /tree/year at three equal doses as previously mentioned with nitrogen.

Table 1. Analysis of the tested soil.

Constituents	Values
Sand %	79.5
Silt %	14
Clay %	6.5
Texture	Sandy
pH (1:2:5 extract)	7.45
E.C. (1:2:5 extract) (mmhos/1 cm / 25°C)	0.95
O.M. %	1.00
$CaCO_3$ %	2.55
Total N %	0.05
Available P ($mg.kg^{-1}$) (Olsen methods)	2.22
Available K ($mg.kg^{-1}$) (Ammonium acetate)	66.0

1.2- Potassium fertilizer:

Potassium in form of potassium sulfate (24 %K_2SO_4) was used at three levels, zero, 1.5 and 3 kg/tree/year, at three equal doses in early March, May and July. In addition, all date palm trees also received the recommended rates of phosphorus and nitrogen fertilizations. Phosphorus fertilizer (in form of calcium super phosphate 18.5% P_2O_5) was applied in equal dose as previously mentioned with nitrogen in November , while nitrogen fertilizer (in form of

ammonium nitrate 33.5%) was added at rate, 0.9 kg /tree/year at three equal doses as previously mentioned with potassium. All other normal agricultural practices were applied as recommended in all experiments.

2- Sampling method:

Samples of 30 leaflets (from three trees) for each rate of fertilizer represented by three trees, were taken randomly at bimonthly intervals Numbers of this insect were recorded to express the population size of *P. blanchardii*.

3- Statistical analysis:

Data obtained were subjected to statistically analysis using a randomized complete block design, with three replicates. Means were compared according to LSD test at $P \leq 0.05$.

4- Relationship between the percentages of nitrogen and potassium in leaflets of seedy Balady date palm variety and the rate of infestation by *P. blanchardii*:

The present study aims to determine the relationship between the percentages of nitrogen and potassium in leaflets of seedy Balady date palm during mid February (end of the year of study) and the rate of infestation by *P. blanchardii* during the year / leaflet.

Total nitrogen (N) in leaflets during mid-February was determined in ground material by micro Kjeldahl methods as recommended by **Bremner (1965)** and Potassium (K) was determined by flame-photometer according to **Brown and Lilliland (1946).**

The data obtained were statistically analyzed by using simple correlation coefficient where the independent variable (x) represented the percentage of nitrogen and potassium in leaflets and the dependent variable (y) represented the mean infestation with *P. blanchardii* during the year/leaflet. The simple regression coefficient was used to show the variability in the numbers of pest that could be caused by the contents of N and K in leaflets during the two successive years adopted according to **Fisher (1950)**.

The equation of linear regression was calculated according to the following formula:

$Y = a \pm bx$

Where:

Y= Prediction value (Dependent variable)

x = Independent variable

a = Constant (y - intercept) **b** = Regression coefficient

Results and Discussion

1- Effect of nitrogen and potassium fertilizations on the population size of the parlatoria date scale insect, *P. blanchardii* infesting date palm trees (Seedy Balady variety):

1.1- Nitrogen fertilizer:

Data represented in Table ,2 show the effects of three nitrogen fertilization levels on the population size of *P. blanchardii* infesting date palm trees (Seedy Balady variety), during the two successive years of 2011/2012 and 2012/2013. The tested three nitrogen fertilization levels were zero, 0.9 and 1.8 kg/tree/year.

Statistical analyses of data reveal significant differences among the three nitrogen fertilization levels, during the two successive years. Generally, significant increase in insect population size was shown in all months with the increase of nitrogen level, during the two years, Table, 2 and illustrated in Fig. , 1.

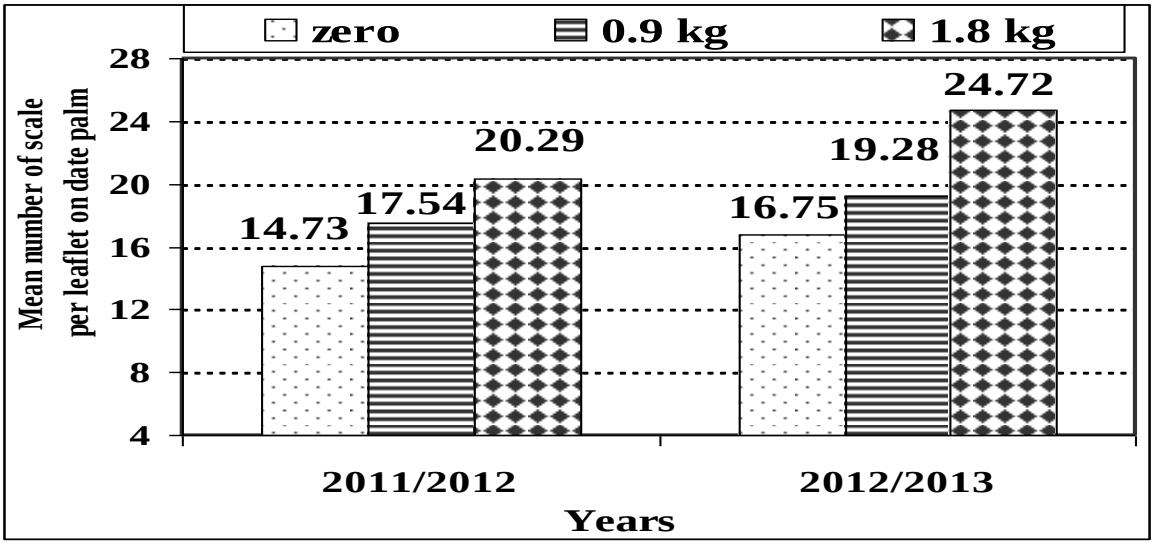

Fig. , 1 : General mean counts of *P. blanchardii* per leaflet on Seedy Balady date palm variety under different nitrogen fertilization levels, during the two successive years of (2011/2012 and 2012/2013) at Esna district, Luxor Governorate.

Table 2. Mean number of *P. blanchardii* leaflet of date palm trees (Seedy Balady variety), under different nitrogen fertilization levels, during the two successive years of (2011/2012 and 2012/2013) at Esna district, Luxor Governorate.

Months	Mean numbers of scale insect per leaflet							
	2011/2012				2012/2013			
	Zero kg / tree / year	0.9 kg / tree / year	1.8 kg / tree / year	L.S.D at 5%	Zero kg / tree / year	0.9 kg / tree / year	1.8 kg / tree / year	L.S.D at 5%
March	7.4	9.0	9.7	**2.0**	7.7	9.9	12.6	**2.1**
April	13.9	16.4	18.0	**3.6**	15.0	17.9	23.0	**3.9**
May	9.7	12.3	14.5	**3.6**	11.3	12.9	17.3	**3.5**
June	6.2	11.8	14.2	**2.9**	11.7	14.2	18.5	**3.4**
July	15.7	17.8	25.0	**3.1**	19.4	20.0	24.9	**3.3**
August	15.4	17.5	20.7	**1.4**	16.7	19.3	24.4	**3.8**
September	21.8	25.3	30.0	**6.2**	25.2	27.3	35.5	**6.7**
October	15.2	17.5	21.8	**3.3**	17.6	19.5	24.5	**3.7**
November	19.4	22.1	24.4	**4.2**	20.8	24.5	30.9	**4.7**
December	27.9	31.3	33.4	**6.5**	29.3	34.7	43.8	**6.8**
January	16.6	19.8	21.3	**4.8**	18.0	21.2	27.7	**5.3**
February	7.4	9.8	10.5	**2.6**	8.2	10.1	13.7	**2.9**
Mean	**14.7**	**17.5**	**20.3**	**0.98**	**16.8**	**19.3**	**24.7**	**1.1**

Table 3. Response of seedy Balady date palm leaflets to different rates of nitrogen fertilizer and their effect on the rate of infestation by *P. blanchardii* during the two years of (2011/20112 and 2012/2013).

Rate of fertilizer	First year (2011/2012)		Second year (2012/2013)	
	Average of N % in leaflet	Mean infestation during the year / leaflet	Average of N % in leaflet	Mean infestation during the year / leaflet
Zero	**1.19**	**14.73**	**1.21**	**16.75**
0.9 kg	**1.24**	**17.54**	**1.26**	**19.28**
1.8 kg	**1.28**	**20.29**	**1.31**	**24.72**

Date palm trees received 1.8 kg/tree/year of nitrogen fertilizer, significantly harboured the maximum mean population density of this insect (20.3 and 24.7 insect / leaflet), followed by those received 0.9 kg/tree/year (17.5 and 19.3 insect / leaflet), during two years, respectively, Table , 2.

However, untreacted trees harboured the lowest mean number of population (14.7 and 16.8 insect / leaflet) during the two successive years of investigation, respectively. The three means of population densities formed three separated groups, Table 2.

Concerning, the response of seedy Balady date palm leaflets to different rates of nitrogen fertilizer and their effect on the rate of infestation by *P. blanchardii* during the two years of (2011/20112 and 2012/2013), Table 3, results show that there are significant increase in the percentage of nitrogen in leaflets with the increase of nitrogen level (1.8 kg/tree/year) and recording the highest population density of insect.

In contrary, the untreated trees (zero kg/tree/year) recorded the least percentage of nitrogen in leaflets and the lowest population density of insect during the two years Tables , 3 .

data in Table , 4 and illustrated in Fig. ,2 , show the relationship between the percentage of nitrogen in leaflets of seedy Balady date palm in mid February (end of the year of study) as independent variable and the rate of infestation by *P. blanchardii* during the year / leaflet as dependent variable.

Table 4. Simple correlation, regression values and linear regression equation when the counts of the percentage of nitrogen in date palm leaflets were plotted versus the rate of infestation by *P. blanchardii* during the two years of (2011/20112 and 2012/2013).

Statistical analysis	First year (2011/2012)	Second year (2012/2013)
r =	0.936 **	0.928 **
b =	66.27 **	84.28 **
Standard error	9.41	12.758
T value	7.05	6.606
Probability	0.000	0.000
Y = a ± bx	- 64.44 + 66.27 x	- 85.94 +84.28 x
R^2	0.936	0.928
E.V.%	93.6	92.8

r = Simple correlation **Y = a ± bx (Regression linear equation)**
b = Simple regression **R^2 = Coefficient of determination**

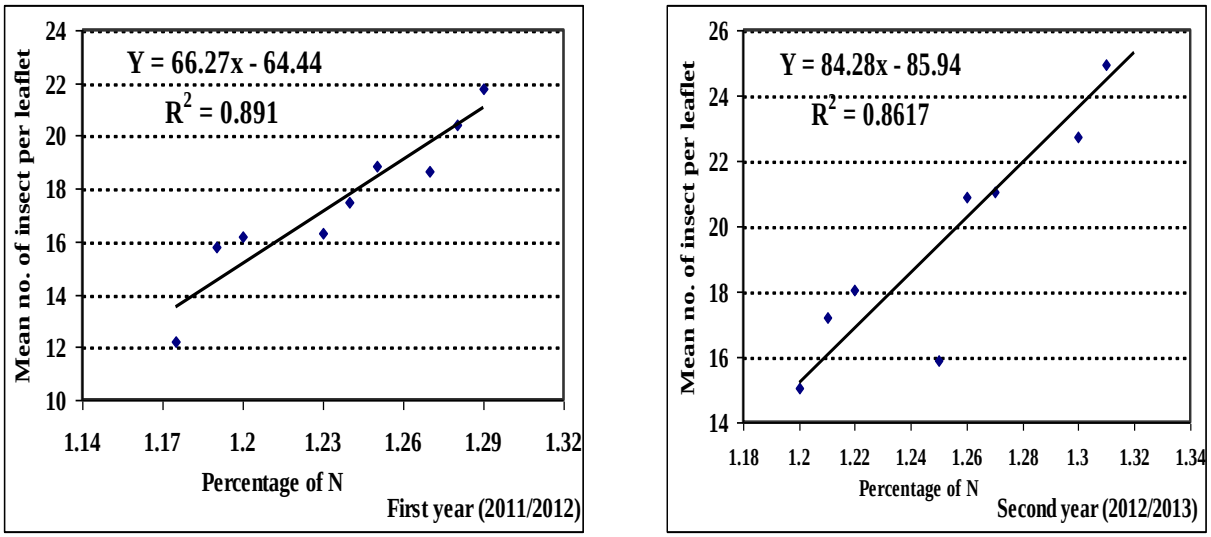

Fig. , 2: Simple linear regression between the percentage of nitrogen in leaflets of date palm and the rate of infestation by P. blanchardii during the two years of (2011/20112 and 2012/2013).

Statistical analysis, reveal that significant positive correlations between the mean total population of P. blanchardii during the year per leaflet and the percentage of N content in the leaflets of seedy Balady date palm variety (r = +0.936 and +0.928) during the first and second years, respectively. The slopes of the regression lines revealed that a unit change of N content (one percent of N in leaflet) increased the rate of infestation with pest by 66.27 and 84.28 %, respectively, Table ,4 and illustrated in Fig. ,2.

These results are in agreement with those reported by Shawki (1968) however with different insect species and different host, who reported that aphid infestation positively correlated with the quantity of nitrogen fertilizer added to plants. They also stated that the increased amount of nitrogen in the plant sap supplies the feeding aphids with abundant and accessible amount of nitrogen necessary for rapid development and multiplication, and the aphids increased and were more abundant in plants fertilized with nitrogen than in unfertilized plants. Korticas and Garsed (1985) stated the improvements in growth of plants at the higher nitrogen levels caused an increased in aphid infestation. Selim (2002) found that Nitrogen increases population size of the two scale insects, Insulaspis pallidula and Aonidiella aurantii infesting mango trees.

1.2- Potassium fertilizer:

Three rates of potassium used were zero, 1.5 and 3 kg/tree/year, added to date palm trees of seedy Balady variety to show their response on population density of P. blanchardii under study at the same region and the same years, Table 5.

Data depicted in Table ,5 and illustrated by Fig. ,3 , prove that the increase of potassium rate decreased the mean of population density of this insect.

Statistical analysis of data resulted in significant differences among the three potassium fertilization levels. The untreated trees (zero fertilizer), recorded the highest infestation reaching (14.8 and 16.88 insect per leaflet) for two years, respectively. while, the treatment of 3 kg potassium /tree/year of potassium fertilizer, recorded the lowest infestation (9.8 and 11.8 insect / leaflet) during 2011/2012 and 2012/2013 years, respectively, Table , 5 .

Concerning, the response of seedy Balady date palm leaflets to different rates of potassium fertilizer and their effect on the rate of infestation by P. blanchardii during the two years of , Table , 6 . Results show that significant increase in the percentage of potassium in leaflets caused by the increase of potassium level (3 kg/tree/year) gave the lowest population density of insect. In contrary, the untreated trees of potassium fertilizer, recorded least percentage of potassium in leaflets and the highest population density of insect during the two years.

Table 5. Monthly mean numbers of P. blanchardii per leaflet of date palm trees (Seedy Balady variety), under different potassium fertilization levels, during the two successive years of (2011/2012 and 2012/2013) at Esna district, Luxor Governorate.

Months	Mean numbers of scale insect per leaflet							
	2011/2012				2012/2013			
	Zero kg / tree / year	1.5 kg / tree / year	3 kg / tree / year	L.S.D at 5%	Zero kg / tree / year	1.5 kg / tree / year	3 kg / tree / year	L.S.D at 5%
March	8.3	6.2	4.9	**0.4**	8.3	7.1	6.0	**1.0**
April	13.9	12.2	9.7	**2.7**	15.6	13.8	11.2	**3.1**
May	11.2	8.5	6.7	**0.8**	12.7	9.6	7.9	**1.4**
June	10.3	9.4	7.4	**2.1**	12.8	10.3	8.8	**1.4**
July	15.6	12.6	9.9	**0.6**	17.6	14.2	12.1	**1.5**
August	15.4	12.9	10.2	**2.0**	17.3	14.6	12.0	**2.4**
September	20.8	17.1	13.5	**1.6**	23.4	19.4	16.5	**3.0**
October	15.4	13.5	10.7	**2.8**	17.3	14.8	12.3	**3.1**
November	19.2	15.5	12.3	**1.0**	21.6	17.6	14.9	**2.1**
December	25.4	22.6	17.8	**3.6**	28.6	25.6	21.3	**4.4**
January	13.6	12.3	9.7	**1.8**	17.4	13.9	12.4	**2.4**
February	8.5	6.7	5.3	**1.3**	10.0	7.6	6.3	**1.3**
Mean	**14.8**	**12.5**	**9.8**	**0.59**	**16.9**	**14.0**	**11.8**	**0.67**
L.S.D.$_{(0.05)}$ between months = 0.40				**0.456**				

Table 6. Response of seedy Balady date palm leaflets to different rates of potassium fertilizer and their effect on the rate of infestation by P. blanchardii during the two years of (2011/20112 and 2012/2013).

Rate of fertilizer	First year (2011/2012)		Second year (2012/2013)	
	Average of K % in leaflet	Mean infestation during the year / leaflet	Average of K % in leaflet	Mean infestation during the year / leaflet
Zero	0.89	14.79	0.92	16.88
1.5 kg	0.92	12.46	0.96	14.04
3.0 kg	0.94	9.84	0.98	11.81

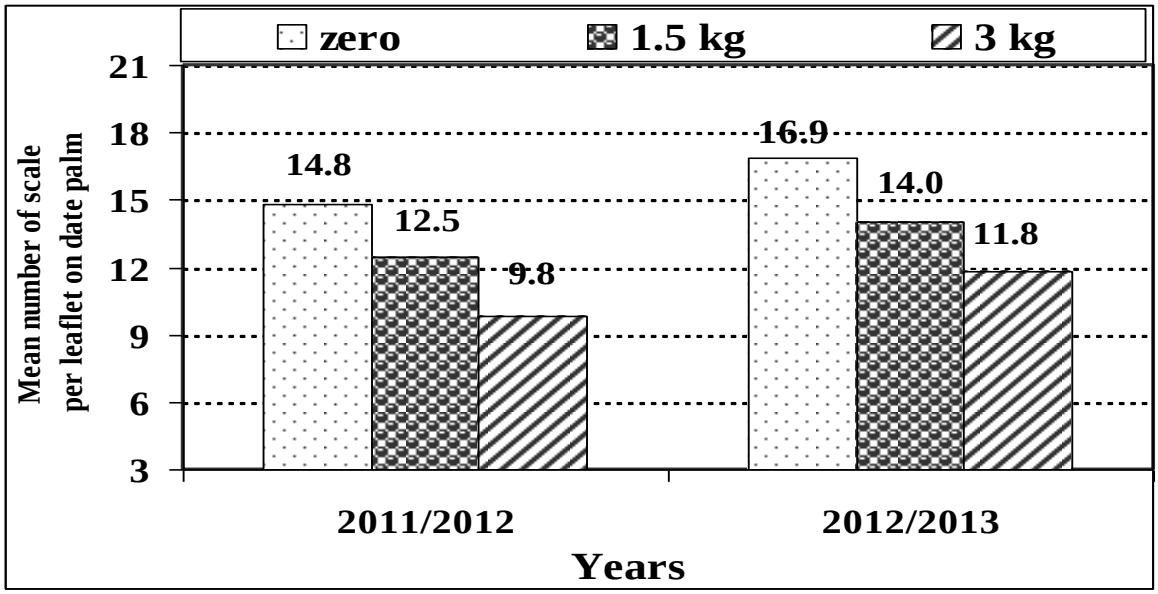

Fig. , 3 : General mean counts of *P. blanchardii* per leaflet on Seedy Balady date palm variety under different potassium fertilization levels, during the two successive years of (2011/20112 and 2012/2013) at Esna district, Luxor Governorate.

As shown in Table, 7 and illustrated in Fig. , 4, show the relationship between the percentage of potassium in leaflets of seedy Balady date palm during mid February as independent variable and the rate of infestation by *P. blanchardii* during the year / leaflet as dependent variable.

Results of statistical analysis, reveal that there are significant negative correlation between the rate of infestation with *P. blanchardii* and the percentage of K content in the leaflets of seedy Balady date palm variety (r = -0.945 and -0.968) during the first and second years, respectively. As well , the calculated slopes of the regression (b) revealed that a unit change of K content (one percentage of K in leaflet) decreased the rate of infestation with pest by 58.38 and 78.14 %, respectively, table , 7 and Fig. ,4 .

These results coincided with those obtained by **Hulesman *et al.* (2000)** however with different insect species and different host, revealed that there were significant negative correlation between the total pest population and potassium level in the soil in sweet potato crops. Also, **Das and Dutta (2001)** mentioned that the K content of leaves exhibited significant negative correlation with the population density of *Aphis craccivora* Koch. **Selim (2002)** found that the potassium is the highest element of effective decreasing in the population of the two scale insects (*Insulaspis pallidula* and *Aonidiella aurantii*) on mango trees.

Table 7. Simple correlation, regression values and linear regression equation when the counts of the percentage of potassium in date palm leaflets were plotted versus the rate of infestation by *P. blanchardii* during the two years of (2011/20112 and 2012/2013).

Statistical analysis	First year (2011/2012)	Second year (2012/2013)
r =	- 0.945 **	- 0.968 **
b =	- 58.38 **	-78.14 **
Standard error	7.62	7.71
T value	7.7	10.14
Probability	0.000	0.000
Y = a ± bx	65.29 – 58.38 x	88.81 -78.14 x
R^2	0.893	0.937
E.V.%	89.3	93.7

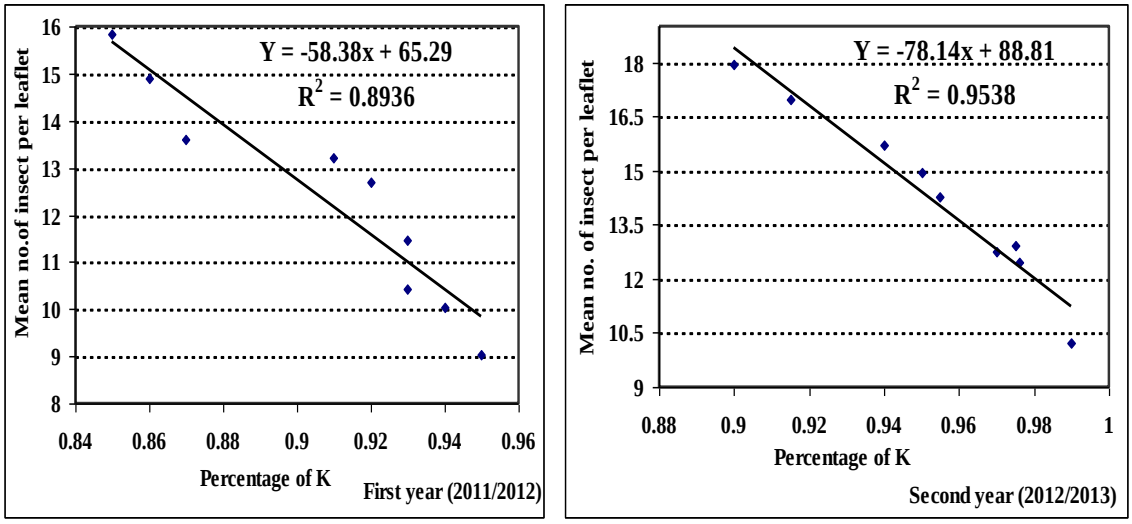

Fig. 4

Low population density of this pest determined in the present study on date palm tress received high levels of potassium fertilization (3 kg / tree / year), may be attributed to that, potassium supply affects certain physiological processes occur in date palm leaves. These physiological processes my include growth, photosynthesis, leaf moisture content, activity of certain metabolic enzymes in plant leaves, movement of sucrose from leaf to storage tissues, foliar respiration rates. Consequently, any change in these physiological processes, might influence the liability and favorite of date palm leaves to be infested by this insect pest.

Also , we added that potassium causes sclerotization of leaf tissue , that affected on insect feeding .

From the above-mentioned discussion, it could be concluded that the lowest infestation was found in date palm trees treated with zero rate of nitrogen and 3 kg/tree/year of potassium , while , the mean highest infestation was observed under 1.8 kg of nitrogen and zero rate of potassium.

Indirectly, potassium deficiency might affect sugar movement owing to changes in growth, photosynthesis, or moisture content **(Burr *et al.*, 1957)**.

Spanner's (1958) concept of potassium activity at the sieve plate offers a direct means by which insufficient potassium might drastically restrict sucrose translocation.

On the other hand, various authors have noted an apparent essential effect of potassium for normal enzyme behavior in plant metabolic reactions. **Alexander (1964)** examined a number of metabolic enzymes in levels of plant given gradually reduced potassium in nutrient solutions over a period of 18 weeks. Decreasing potassium supply increased hexokinase activity and repressed both phosphohexose isomerase and phosphoglyceryl kinase. Foliar glucose accumulation parallel the decline of the latter two enzymes. **Yuz Bash Yan and Khamraev (1989)** reported that the reproductive rates of aphids decreased when plants received a high supply of potassium. The treatment increased the levels of polysaccharides and starch containing hemicellulose and also crude protein and all forms of nitrogen in the plants, both discouraging infestation and favouring growth.

El-Metwally *et al.* (2002) attributed the low population abundance of the scale insects, *Pulvinaria tenuivalvata* on sugarcane plant received high level of potassium fertilization to the role of sugar translocation from leaves to stalks, which was enhanced by increasing of potassium level in plants. These plants will have leaves of juice and carbohydrates deficiency, thus will become unfavourable for insect settling and feeding. They added also that potassium supply causes considerable sclerotization of leaf tissue, which opposes insect feeding; particularly for early nymphs stage.

Shalaby *et al.* (2007) stated that using the GT 54/9 variety and 50 kg potassium applied with the second dose of recommended nitrogen decreased the infestation by *Chilo Agamemnon*. While, using the PH 8013 variety and 50 kg potassium**,** by the same way, decreased the population density of *P. tenuivalvata*.

In general, from the inconsistencies obtained with potassium in different regions, it appears that potassium is performing some highly-localized functions relative to sugar transport and storage. Anyhow, this point of investigation needs further studies.

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تأثير التسميد النتروجينى والبوتاسى على حجم تعداد حشرة النخيل القشرية البيضاء التى تصيب أشجار نخيل البلح فى محافظة الأقصر – مصر.

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تهدف هذه الدراسة إلى تقدير علاقة المستويات المختلفة من التسميد النتروجينى والبوتاسى على حجم تعداد حشرة نخيل البلح القشرية البيضاء التى تصيب أشجار نخيل البلح (للصنف البلدى البذرة) المنتشر فى مركز إسنا – محافظة الأقصر.

أوضحت النتائج بخصوص التسميد الأزوتى:

أن التحليل الاحصائى أظهر وجود أختلافات معنوية فيما بين المعدلات التسميد الأزوتى الثلاث خلال عامى الدراسة. وبصفة عامة، لوحظ،، زيادة معنوية فى حجم تعداد الحشرة فى كل شهر بزيادة مستوى التسميد الأزوتى خلال عامي الدراسة.

كما أشارت النتائج، أن أشجار نخيل البلح التى عوملت بأعلى جرعة من التسميد الأزوتى (1.8 كجم /للشجرة /سنة) أحتوت على أعلى كثافة عددية للحشرة بمتوسط (20.3، 24.72 فردا) لكل وريقة، يليها أشجار النخيل التى عوملت بجرعة (0.9 كجم /للشجرة /سنة) كانت متوسطة الإصابة بالحشرة بمتوسط تعداد (17.5، 19.3 فردا) لكل وريقة خلال عامي الدراسة على التوالى.

أما أشجار النخيل الغير معاملة (صفر كجم /للشجرة /سنة) أحتوت على أقل كثافة عددية للحشرة بمتوسط تعداد (14.7، 16.8 فردا) لكل وريقة خلال عامي الدراسة على التوالى.

أما بخصوص التسميد البوتاسى:

فأن التحليل الاحصائى أظهر وجود أختلافات معنوية فيما بين المعدلات الثلاث المختلفة من التسميد البوتاسى خلال عامى الدراسة.

حيث لوحظ ، أنخفاض معنوي فى حجم تعداد الحشرة فى كل شهر بزيادة مستوى التسميد البوتاسى خلال عامي الدراسة. كما أوضحت النتائج، أن أشجار نخيل البلح الغير معاملة بالتسميد البوتاسى (صفر كجم /للشجرة /سنة) أحتوت على أعلى كثافة عددية للحشرة بمتوسط تعداد (14.8، 16.88 فردا) لكل وريقة، خلال عامي الدراسة. بينما، أشجار النخيل التى عوملت بأعلى معدل تسميد (3 كجم /للشجرة /سنة) احتوت على أقل كثافة عددية بمتوسط تعداد (9.8، 11.8 فردا) لكل وريقة خلال عامي الدراسة على التوالى. كما أتضح وجود علاقة سالبة بين زيادة جرعة التسميد البوتاسى وتعداد الحشرة خلال عامي الدراسة على التوالى.

وعموما أكدت النتائج ، أن أقل كثافة عددية للحشرة لوحظت عند معاملة أشجار نخيل البلح بجرعة من التسميد الأزوتى (صفر كجم /للشجرة /سنة) و جرعة (3 كجم /للشجرة /سنة) من التسميد البوتاسى. بينما أعلى كثافة عددية للحشرة عند معاملة أشجار نخيل البلح بجرعة من التسميد الأزوتى (1.8 كجم /للشجرة /سنة) و جرعة (صفر كجم /للشجرة /سنة) من التسميد البوتاسى.

وهذا البحث قَد يُضيف بَعْض المعلوماتِ التى يمكن إستخدامهاَ في برامجِ المكافحة المتكاملةِ للسَيْطَرَة على حشرة نخيل البلح القشرية البيضاء.