

Cognitive awareness of extension workers, farmers of major insect pests infecting dates, palms

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Abstract: *The research aims at identifying cognitive awareness of extension workers and farmers of the prevalence of major insect pests infecting palms and dates, determining the cognitive awareness of extension workers and farmers of infection symptoms with date, palm pest insects, identifying cognitive awareness of extension workers and farmers of prevention, control methods of major insect pests infecting palms, dates, comparatively determining cognitive awareness of extension workers, farmers of major insect pests infecting palms in terms of (the prevalence of pests, symptoms of infection, prevention and control) and determining the relationship between farmers' cognitive awareness of major insect pests infecting palms and each of the following factors (age, education, annual income from the production of dates, experience in palm cultivation, amount of production). In order to achieve research objectives, a scale was used to measure cognitive awareness. It consisted of 34 items distributed over 3 axes, 8 items of which measure the prevalence of major palm and date pests, 15 items measure the awareness of farmers, workers of infection symptoms with palm pests, and 10 items measure the awareness of farmers, workers of control and prevention methods. Data were collected by means of a questionnaire through interviews with a stratified, proportional random sample from the community of palm farmers in the two districts of Badra and Azizia. It consisted of 368 farmers (25%), i.e. 92 respondents were taken, while the entire community of extension workers was adopted as their number was only 30.*

A penta- scale was set in order to measure the prevalence of major date, palm pests measuring (very high prevalence, high prevalence, moderate prevalence, low prevalence, very low prevalence) and was given the following rating numbers (1.2.3.4.5) respectively. Cognitive awareness was measured by a test in which two degrees were given to a correct answer, one degree to "no", and zero to "I do not know".

*The results showed that, from the standpoint of extension workers, the most prevalent date, palm pest insects are Dubas bug (*Ommatissus lybicus*), Lesser date moth (*Batrachedra amydraula* Meyer), Dust spider (*Oligonychus afrasiaticus*), whereas from the perspective of farmers, the most prevalent date, palm pests are Lesser Date Moth (*Batrachedra amydraula* Meyer), Dubas bug (*Ommatissus lybicus*), Red wasp (*Polistes carolina*). Extension workers agreed that Red wasp (*Polistes carolina*), Greater Date Moth (*Arenipises sabella*) and Longhorn beetle (*Cerambycidae*) were of moderate prevalence, while Fruit stalk borer (*Oryctes elegans*) and Date palm scale (*Parlatoria blanchardi*) were considered of low prevalence.*

*From the farmers' point of view both Dust spider (*Oligonychus afrasiaticus*) and Longhorn beetle (*Cerambycidae*) were moderately prevalent, while Date palm scale (*Parlatoria blanchardi*), Greater Date Moth (*Arenipises sabella*), Fruit stalk borer (*Oryctes elegans*) were of low prevalence.*

*The results showed a significant relationship at a level of (0.05, 0.01) between the awareness of farmers and extension workers of the degree of prevalence of major insect pests. The mean awareness of extension workers of infection symptoms with major insect pests was higher than the score of farmers' awareness of these pests. Extension workers' mean knowledge of infection symptoms with Date palm scale (*Parlatoria blanchardi*) was higher than the farmers' mean knowledge of infection with that pest at a level of 0.01.*

The results also showed that extension workers' mean knowledge of control methods of these pests was higher than that of farmers, which proves the significance of these differences, at a level of 0.01. There was also a significant relationship between the degree of cognitive awareness of palm, date farmers of each of the following (age, education, the contribution of palm cultivation to income, the amount of annual production), while there were insignificant differences between cognitive awareness degree of farmers and the number of years worked.

Thus, the research recommends developing extension programs to bring to light the most important insect pests infecting palms, dates and a particular focus on major pests most prevalent in research area and focusing attention on activities, counseling services concerning the cultivation of date palms in order to acquaint farmers with pests infecting palms and their economically harmful levels, and with the types of pesticides used to eliminate them.

I. Research introduction, problem:

A Phoenix dactylifera L. tree, belonging to the Palmaceae family, is one of the oldest fruit trees planted in the Middle East (14). Date palm is an important source of food in many countries, since the fruits of which are of high nutritional value, as well as for being used as a raw material in many food industries (3), as palm fruits contain a high proportion of carbohydrates (44% -88%), fat (0.2% -0.5%), proteins (2.3% - 5.6%), vitamins and a high proportion of dietary fiber (6.4% -11.5%) (18). Due to this importance, the number of palm trees has increased at the global level, reaching more than 100 million trees and a productivity of 6 million tons (9), distributed over many countries of the world, including the Arab world, where Iraq occupies the fifth place among the producing countries according to statistics in 2001, after each of Egypt, Iran, Saudi Arabia and Pakistan (8), as the production of Iraq at the time was 400,000 tons, that is 5.9% of world production (15), although in 1996, the production of Iraq and Iran constituted 35% of world production (13), not to mention the lowering number of palm trees from 30 million trees to 16 million in 2004, and then to 8 million only (17).

This decline in the number of palms and their productivity has been due to wars and environmental conditions the country has encountered, as well as the exposure of palm trees to many insect, non-insect pests and diseases that have caused a deterioration in productivity, such as Dubas bug (*Ommatissus lybicus*), Lesser date moth (*Batrachedra amydraula* Meyer) and Dust spider (*Oligonychus afrasiaticus*) have brought a decline in production that reached more than 50 % in some seasons, 1999-2000 (1), affecting the quality, quantity of dates since vaccination till consumption or usage in various industries. All of that have reduced dates prices by approximately 50% (5). Handling this problem requires farmers' awareness of how to diagnosis pests and insects infecting palms, dates and how to deal with pesticides properly, which is a prerequisite to ensure control and avoid harm to humans and to agricultural production, which is the responsibility of extension system, i.e. the delivery of scientific awareness to target through the publication and dissemination of recommendations and agricultural, technical ideas related to palm trees and dates. However, we have noticed that extension services provided to palm farmers have not been at the required level, which has led palm farmers to face many problems, as indicated by the study of Al-Janabi, (2) stating that palm farmers are experiencing natural problems as well as problems related to extension systems. Perhaps the most prominent of those problems are those related to palm service input, such as fertilizers and pesticides. In addition, another study indicated that one the major problems faced by the majority of the research sample members was the diagnosis of insects infecting palms and methods of control (16), while Hugail study (11) pointed out to the low level of farmers' skills and knowledge of the diseases affecting palms and how to combat them.

It is clear from the studies above that identifying farmers' cognitive awareness of major pests of palms, dates is important. It is also important to determine how aware they are of the symptoms and methods of controlling them. Due to the importance of this tree and the need to address the problems facing growth and reproduction, this research is to answer the following questions:

- (1) How aware are extension workers and farmers of major insect pests infecting palms, dates in general?
- (2) How aware are extension workers and farmers of each of the following themes:
 - The prevalence of major insect pests infecting palms dates.
 - Symptoms of palms, dates infection with major insect pests.
 - Methods of prevention control of major insect pests infecting palms, dates.
- (3) What is the difference between the cognitive awareness of extension workers and that of farmers concerning each of the following themes (prevalence of pests, symptoms of infection, prevention and control)?
- (4) What is the relationship between farmers' cognitive awareness of major insect pests infecting palms and all of the following independent variables (age, education, annual income from the production of dates, experience in palm cultivation, and amount of production)?

Research objectives: -

The research mainly aims at determining the level of cognitive awareness of extension workers and farmers of major insect pests infecting palms, dates through the following sub-objectives: -

- (1) Determining the cognitive awareness of extension workers and farmers in general.
- (2) Determining the cognitive awareness of extension workers and farmers of each of the following themes:
 - The prevalence of major insect pests infecting palms, dates.
 - Symptoms of palm, date infection with major insect pests.
 - Methods of prevention and control of the major insect pests infecting palms, dates.
- (3) Determining the difference between the cognitive awareness of extension workers and farmers of each of the following themes (prevalence of pests, symptoms of infection, prevention and control).
- (4) To determine the relationship between farmers' cognitive awareness of major insect pests infecting palms and all of the following independent variables (age, education, annual income from the production of dates, experience in palm cultivation, amount of production).

Research hypotheses:

- 1 - There are significant differences between the cognitive awareness of extension workers and that of farmers regarding the extent of prevalence of major insect pests infecting palms, dates.
- 2 - There are significant differences between the cognitive awareness of extension workers and that of farmers concerning methods of control, prevention of major insect pests infecting palms, dates.
- 3 - There are significant differences between the cognitive awareness of extension workers and that of farmers with regard to infection symptoms with major insect pests infecting palms, dates.
- 4 - There is a correlation between farmers' cognitive awareness of major insect pests infecting palm, dates and all of the following independent variables: age, education, annual income from the production of dates, experience in palm cultivation, and amount of production.

Materials, methods: -

This research comes as part of the survey researches which fall within the descriptive approach. Ubaidat (7) points out that the research is based on studying the phenomenon on the ground, and pays attention to accurate description. It also gives qualitative and quantitative descriptions. Qualitative description describes the phenomenon and shows its characteristics, while the quantitative gives us a digital description of the amount / size of the phenomenon.

Research community: -

The research community included:

- 1 - All districts of the province of Wasit. The province was chosen for being one of the central provinces that are easily accessible and which is famous for the cultivation of palms. Moreover, the province is the first of the country' provinces in terms of average productivity per palm, as it amounted to 79.9 kg / Palm (10)
- 2 - Extension workers present in the province of Wasit, totaling 30, distributed over 7 agricultural divisions: Al-Suwayrah, Al-Hifriyah, Al-Azizia, Al-Zubaydah Al-Nu'maniyah, Al-Hay and Badra. The entire community of extension workers was taken due to its small number.
- 3 - Palm farmers spread across the province of Wasit, totaling 900.

The research sample: -

- 1 - A proportional random sample constituting 30% from the districts of Wasit province, namely Badra and Azizia.
- 2 - A stratified proportional random sample constituting 25% (92 respondents) of the community of palm farmers totaling 368, from the two districts of Badra and Azizia, as shown in Table 1.

Table 1: Distribution of farmers' sample over districts included in the sample:

Province	Number of Districts	District	Number of Farmers	Farmer Sample No.
Wasit	7	Badra	160	40
		Azizia	208	52
Total		368	92	

Questionnaire preparation, development:

A questionnaire was drafted for the purpose of collecting data related to research after reviewing the literature and studies related to the subject matter, as well as the views of experts and specialists of the field. A questionnaire is an essential tool and a good common means (6) through which research objectives can be achieved. The primary formula of the questionnaire consisted of:

Part I: this included questions regarding the characteristics of respondents, namely, (age, education, annual income from production of dates, experience in palm cultivation, amount of production).

Part II: Building a measure for cognitive awareness of extension workers and farmers of major pests of palms, dates, which included 34 items distributed on 3 themes, 8 items for prevalence of pests, 15 items infection symptoms and 10 items for control, prevention methods.

Measuring validity:

For the purpose of checking its validity, the questionnaire was presented to a group of experts in agricultural extension and plant protection, to ensure that questions do measure awareness level of extension workers and farmers of major palm, date pests. The questions were approved without any change. Thus, a priori validity and content validity of the form were measured. A preliminary test of the form was made on a sample of 14 randomly chosen farmers from outside the sample.

Measuring reliability:

Reliability was measured through statistical analysis of the initial test data using the retail mid-term method for the cognitive awareness test, the Pearson coefficient value was (0.88). To check the validity of the questionnaire, the root of the reliability coefficient was extracted (0.93). Alpha Cronbach scale was used to

measure reliability of prevalence that was found to be 0.88. This indicates a high reliability of standards used in questionnaire.

Data collection:

Data were collected from 92 farmers and 30 extension workers. Their answers were written down throughout the period from 20/01/2012 to 15/3/2012, via personal interviews.

Data tabulation, analysis:

First: cognitive awareness of respondents was measured through:

1. A Likert scale to measure prevalence of palm pests consisting of (very high prevalence, high prevalence, moderate prevalence, low prevalence, nought) and was given the rating numbers (1.2.3.4.5) respectively.
2. A test of 26 items, to measure cognitive awareness of respondents, where two degrees were given to a correct answer, one to a less correct answer and zero to a wrong answer. Thus, the total score of the scale ranged between (0-52) degrees.

Second: measuring independent factors

The relevant independent factors were measured as follows:

- 1 - Age: measured by calculating the number of years of a farmer's life at the time of collecting data.
- 2 - Education: measured according to the following levels: (Illiterate, literate, primary school, intermediate school, high school, college and above) to which the following rating numbers were given respectively (1.2.3.4.5.6.7).
- 3 - Annual income from the production of dates: three levels were made (high, medium, low) and was respectively given the rating numbers (1.2.3).
- 4 - Experience in palm cultivation: calculated according to the actual number of years in the field of date palm cultivation.
- 5 - The amount of production: measured according to average quantity of production kg / palm.

Results and discussion:

First objective: determining the cognitive awareness of extension workers and farmers of major insect pests infecting palms, dates in general.

The results showed that the highest numeric value for extension workers' awareness of major insect pests infecting palms, dates was 38 degrees, the least numeric value 24 degrees, an arithmetic mean of 1 degree and a standard deviation of . The highest numeric value for farmers' awareness of major insect pests infecting palms, dates was 37 degrees, the least numeric value 15 degrees, an arithmetic mean of 25.42 degrees and a standard deviation of , as shown in the following table:

Table 2: Respondents cognitive awareness of major insect pests infecting dates, palms:

Extension Workers' Cognitive Awareness				Farmers' Cognitive Awareness					
Category	Category Limits	Number	%	Awareness Mean Score	Category	Category Limits	Number	%	Awareness Mean Score
Low	-24 28	8	26.7	26.27	Low	-15 22	22	23.9	19.86
Medium	-29 33	19	63.3	30.63	Medium	-23 30	56	60.9	25.91
High	-34 38	3	10	35.33	High	-31 38	14	15.2	34.42
Total		30	100		Total		92	100	

Seen from the table above, the highest percentage of extension workers' awareness of major insect pests infecting palms, dates is 63.3 and the mean is 30.63 within the medium category, the lowest percentage is 10 with a mean of 35.33 within the high category. That could be attributed to Agriculture ministry departments' focusing attention on the development of palm cultivation in the last two years through extension services provided to farmers, which has reflected on the awareness of farmers, as the highest percentage was 60.9 within the medium category, with a mean of 25.91, while the least percentage was 15.2 within the high category, with a mean of 34.42.

The second objective: determining the cognitive awareness of extension workers and farmers of each of the following themes:

- 1 - Symptoms of palms, dates infection with insect pests.

The results showed that the mean degree of cognitive awareness of extension workers and farmers of palms, dates infection symptoms was (1.017, 170.8) degrees respectively, as shown in Table 3.

Table 3: Cognitive awareness scores for extension workers and farmers of infection symptoms with major palm, date pests:

Infection Symptoms With Major Pest Insects	Extension Workers		Farmers		Difference	Calculated T
	Arithmetic Mean	Order	Arithmetic Mean	Order		
Red Wasp	0.75	8	0.60	8	0.15	1.500
Greater Date Moth	0.80	7	0.67	7	0.03	1.199
Date Palm Scale	0.88	6	0.70	6	0.18	18.33 **
Longhorn Beetle	1.2	2.5	0.89	3	0.31	5.4
Fruit Stalk Borer	1.2	2.5	0.93	2	0.27	1.490
Dubas Bug	0.9	5	0.83	4	0.08	1.210
Lesser Date Moth	1.07	4	0.72	5	0.35	3.186
Dust spider	1.34	1	1.2	1	0.14	1.500
	- X = 1.017 S.D = 3.72		- X = 0.817 S.D = 4.98			

Evident from the table (3), there is a descending order of awareness degree of both extension workers and farmers of palms, dates infection symptoms with major insect pests, according to the mean.

As the results showed, there is considerable variation between the scores for extension workers' awareness, as Dust spider (*Oligonychus afrasiaticus*) came first, with a mean awareness of (1.34) degrees, while the scores for extension workers' knowledge concerning both Longhorn beetle (*Cerambycidae*) and Fruit stalk borer (*Oryctes elegans*) were the same, with a mean of (1.2) degrees, whereas Dust spider (*Oligonychus afrasiaticus*), Fruit stalk borer (*Oryctes elegans*) and Longhorn beetle (*Cerambycidae*) occupied the top three from the perspective of farmers, as the mean awareness of infection symptoms with pest insects was (1.2, 0.93, 0.89) respectively. As shown in the same table, the degree of farmers' awareness of the rest of insect pests was low, compared to extension workers who had cognitive awareness of them, due to their scientific experience; farmers only cared about pests most prevalent in their areas, therefore, they had little awareness of infection symptoms with other insect pests.

The results also showed that extension workers' mean awareness score for infection symptoms with the most important insect pests was higher than the score of farmers' awareness of these pests, as the mean was (1.017, 0.817) respectively, while it was clear that the score for farmers' knowledge of infection symptoms with the rest of pests was low, compared to extension workers who had no cognitive lack of practical experience in the field of prevention of plant diseases.

In order to compare extension workers' mean knowledge score of infection symptoms with major pests included in the research with that of farmers, (t) test was used, whereby results showed that extension workers' mean knowledge score of infection symptoms with Date palm scale (*Parlatoria blanchardi*) was higher than that of farmers at a level of 0.01. This could be attributed to the fact that extension workers had more awareness of the infection symptoms of that pest, due to personal characteristics such as high education level and academic experience in the field.

2 –The combating of major insect pests infecting palms, dates and methods of prevention.

Cognitive awareness scores of extension workers and farmers for combating major insect pests infecting palms, dates were arranged in descending order according to their means, as shown in Table 4.

Table 4: Cognitive awareness scores of extension workers and farmers for combating major insect pests infecting palms, dates:

Insect	Extension Workers		Farmers		Difference	Calculated T
	Arithmetic Mean	Order	Arithmetic Mean	Order		
Red Wasp	0.9	6	0.8	6	0.1	5.14
Greater Date Moth	0.8	7	0.6	7.5	0.2	2.3
Date Palm Scale	0.7	8	0.6	7.5	0.1	5.14
Longhorn Beetle	1.2	2	1.2	1	0	0.000
Fruit Stalk Borer	1.1	4	1.0	2.5	0.1	5.14
Dubas Bug	1.24	1	0.94	4	0.30	1.643
Lesser Date Moth	1.12	3	0.9	5	0.22	2.292
Dust Spider	1.06	5	1.0	2.5	0.06	1.682
	- X = 1.015 S.D = 0.937		- X = 0.88 S.D = 1.374			

Evidenced by the data in the table above, that there is a variation in respondents' cognitive awareness scores regarding the combating of major palm pests, as it was clear that each of Dubas bug (*Ommatissus lybicus*), Longhorn beetle (*Cerambycidae*), Lesser date moth (*Batrachedra amydraula* Meyer) occupied the top three from the standpoint of extension workers, with a mean of (1.24, 1.2 1.12) respectively, while farmers' awareness scores for combating Greater date moth and Date palm scale (*Parlatoria blanchardi*) were the same, with a mean of 0.6. The data in Table 4 also reflect the farmers' low mean knowledge score for combating methods of all pests included in the research in general, in comparison to extension workers, whose mean knowledge score was (0.88, 1.015) respectively.

To compare respondents' mean awareness of control methods from the standpoints of extension workers and farmers, (t) test was used, whereby results showed that workers' mean knowledge score for methods to combat those pests was higher than that of farmers, which was proved by the significance of these differences, at a level of 0.01. This could be due to lack of knowledge, for being interested only in control methods of pests most prevalent in their areas, as well as their reliance mainly on control teams and preventive spraying provided by the branches of the Directorate of Agriculture.

The third objective: identifying cognitive awareness of extension workers and farmers of the extent of the prevalence of major insect pests infecting palms, dates.

The results showed that, for extension workers, the overall mean prevalence of major pests of palms, dates was 29.96, while for farmers, the overall mean was 21.01, as shown in Table 5.

Table 5: The prevalence of major palm, date pests from the standpoint of extension workers and farmers:

Insect	Extension Workers		Farmers		Difference	Calculated T
	Arithmetic Mean	Order	Arithmetic Mean	Order		
Dubas Bug	4.46	1	4.22	2	0.24 *	1.191
Lesser Date Moth	4.44	2	4.33	1	0.11 *	1.044
Dust Spider	3.4	3	2.25	4	0.85 *	3.699
Red Wasp	3.2	4	3.22	3	0.02 **	0.00
Longhorn Beetle	2.46	6	2.11	5	0.35 *	1.775
Greater Date Moth	3.16	5	1.41	7	0.75 *	3.915
Fruit Stalk Borer	1.96	7	1.30	8	0.13 *	1.610
Date Palm Scale	1.71	8	1.43	6	0.25 *	1.072
	- X = 29.96 S.D = 2.96		- X = 21.01 S.D = 3.37			

* Difference in favor of workers ** difference in favor of farmers.

Seen from the table above, from the standpoint of extension workers, the most prevalent palm, date pest insects were Dubas bug (*Ommatissus lybicus*), Lesser date moth (*Batrachedra amydraula* Meyer), Dust spider (*Oligonychus afrasiaticus*), occupying the top three, with a mean prevalence of (4.46, 4.44, 3.4) respectively, while the most prevalent palm, date pest insects from the standpoint of farmers were Lesser date moth (*Batrachedra amydraula* Meyer), Dubas bug (*Ommatissus lybicus*) and Red wasp (*Polistes carolina*), occupying the top three, with a mean prevalence of (4.33, 4.22, 3.22) respectively.

Extension workers had equal views in that Red wasp (*Polistes carolina*), Greater date moth (*Arenipses sabella*), Longhorn beetle (*Cerambycidae*) were of moderate prevalence, with a mean prevalence of (3.2, 3.16, 2.46) respectively, while Fruit stalk borer (*Oryctes elegans*) and Date palm scale (*Parlatoria blanchardi*) were considered of low prevalence in the research area, as they came last with a mean prevalence of (1.96, 1.71) respectively.

From the standpoint of farmers, Dust spider (*Oligonychus afrasiaticus*) and Longhorn beetle (*Cerambycidae*) were of moderate prevalence, with a mean prevalence of (2.25, 2.11) respectively, while Date palm scale (*Parlatoria blanchardi*), Greater date moth (*Arenipses sabella*) and Fruit stalk borer (*Oryctes elegans*) were of low prevalence in the research area, with a mean prevalence of (1.43, 1.41, 1.30) respectively.

The results also showed that, from the viewpoint of extension workers, the mean prevalence of these pests was higher than that of farmers regarding all pests included in the research, as the mean for extension workers was 29.96, while that of farmers was 21.01. This result is identical with the findings of a study conducted in Riyadh,

Saudi Arabia, which indicated that there is a big difference between those working in the field of agricultural extension and farmers with respect to the knowledge of identifying and controlling insect pests (12).

In order to compare these differences between the two groups (farmers and workers), a (t) test was used with data on pests themselves, as it indicated the significance of these differences at a level of (0.05 and 0.01). These results are, to a large extent, seen as logical because extension workers have more knowledge of pests and ways by which they spread, through diagnosing palms infecting with pests, maintaining long practical experiences, and exposure to training programs in this area.

The fourth objective: determining the relationship between farmers' cognitive awareness of major insect pests infecting palms and each of the following independent variables:

1 - Age:

The results showed that the highest percentage (25%) falls within the category (40-49), and the lowest percentage (16.3%) within the category (20-29), as shown in Table 6.

Table 6: Distribution of respondents according to age groups and their relationship to cognitive awareness level:

Age Group	Number of Farmers	%	Cognitive Awareness Mean	Pearson Coefficient	Calculated T
20-29	15	16.3	26.17	- 0.224	11.555
30-39	18	19.5	24.33		
40-49	23	25	26.6		
50-59	19	20.7	32.15		
60 +	17	18.5	25	X = 44.09	
Total	92	100		S.D = 14.634	

It follows from the table above, the highest percentage of respondents' cognitive awareness of major insect pests infecting dates, palms is in the age group (50-59), by 20.7%, and that the lowest mean (24.33) is in the age group (30-39), by 19.5%.

To determine the relationship between the level of respondents' cognitive awareness of major insect pests infecting palms, dates, and age, Pearson correlation coefficient was used, the resulting value of which was - 0.224, indicating a negative correlation between the two variables. To verify the significance of the relationship, a (t) test was used. The calculated (t) value was 11.555, which is higher than the tabular scores for cognitive awareness and age is significant. This result is inconsistent with the findings of (Abbas) study (4). Thus, the research hypothesis stating the existence of a significant relationship between the two variables is approved. This is probably due to that older groups had less awareness of major insect pests infecting palms, dates.

2 – Education:

The results showed that the highest percentage was (34.8%), within the category (literate), and the lowest percentage was (9.8%), within the category (intermediate school), as shown in Table 7.

Table 7: Distribution of respondents according to education and its relationship to cognitive awareness level:

Education	Number of Farmers	%	Cognitive Awareness Mean	Spearman Coefficient	Calculated T
Illiterate	18	19.6	25	- 0.232 *	48.678
Literate	32	34.8	24.5	Significant at Level 0.05	
Elementary	23	25	26.5		
Intermediate	9	9.8	25.8		
High School	10	10.8	25.4		
Institute	0	-	-	X = 2.54	
Total	92	100		S.D = 1.199	

It follows from the table above, that the highest mean for respondents' cognitive awareness of major insect pests infecting dates, palms is 26.5 within the category (elementary), with a percentage of 25%, and the lowest mean is within the category (literate), amounting to 24.5, with a percentage of 34.8%.

To determine the relationship between the level of respondents' cognitive awareness of major insect pests infecting palms, dates and education, Spearman coefficient was used, the resulting value of which was 0.232, indicating a correlation between the two variables. To verify relationship significance, (t) test was used. The calculated (t) value was 48.678, which is higher than its tabular value which was 2.652, at a level of 0.01. This indicates the existence of a significant relationship between the two variables. Thus, the research hypothesis stating the existence of a significant relationship between cognitive awareness of farmers and education is approved.

3 - Annual income from the production of dates:

The results showed that the highest percentage was 42%, falling within the category (high), and the lowest was 7%, falling within the category (low), as shown in Table 8.

Table 8: Distribution of respondents according to contribution of palm cultivation to income and its relationship to cognitive awareness level:

Annual Income From Production of Dates	Number of Farmers	%	Awareness Mean Score	Spearman Coefficient	Calculated T
Very High	27	29	25.7	-0.223 - X = 2.94 S.D = 0.88	47.831
High	39	42	25.4		
Medium	20	22	24.7		
Low	6	7	26.3		
Total	92	100			

It follows from the table above, that the highest mean for respondents' cognitive awareness of major insect pests infecting dates, palms is 26.3, falling within the category (low) with a percentage of 7%, and the lowest mean is 24.7, falling within the category (medium), with a percentage of 22%.

To determine the relationship between the level of respondents' cognitive awareness of major insect pests infecting dates palms and the contribution of palm cultivation to farmers' income, Spearman coefficient was used, the resulting value of which was - 0.223, indicating a negative significant relationship between the two variables. To verify relationship significance, (t) test was used. The calculated (t) value was 47.831, which is higher than its tabular value amounting to 2,652 and at a level of 0.01. This indicates a significant relationship between farmers' cognitive awareness and contribution of palm cultivation to their income. Thus, research hypothesis, stating a relationship between farmers' cognitive awareness and the contribution of palm cultivation to their income, is approved.

4 - Experience in the cultivation of palms:

The results showed, that the highest percentage was (44.5%), falling within the category (20-34), and the lowest percentage was (18.5%), falling within the category (35 +), as shown in Table 9.

Table 9: Distribution of respondents according to their experience in palm cultivation and its relationship to cognitive awareness level:

Category	Number of Farmers	%	Awareness Mean Score	Pearson Coefficient	Calculated T
5-19	34	37	24.4	0.097 - X = 23.20 S.D = 11.23	1.822
20-34	41	44.5	26.3		
35 +	17	18.5	25.2		
Total	92	100			

It follows from Table 8, that the highest mean of respondents' cognitive awareness of major insect pests infecting dates, palms is 26.3, falling within the category (20-34), with a percentage of 44.5%, and the lowest mean is 24.4, falling within the category (5-19) with a percentage of 37% .

To determine the relationship between the level of respondents' cognitive awareness of major insect pests infecting palms, dates and experience in palm cultivation, Pearson coefficient was used, the resulting value of which was 0.079, indicating that there is no relationship between the two variables. To verify relationship significance, (t) test was. The calculated (t) value was 1.822 which is less than its tabular (t) value amounting to 1.989, at a level of 0.05, indicating that there is no relationship between the two variables. Thus, the research hypothesis, stating a significant relationship between farmers' cognitive awareness and experience in palm cultivation, is declined.

5 - Amount of annual production:

The results showed that the highest percentage was (71.7%), falling within the category (60-74), and the lowest percentage was (7.6%), falling within the category (45-59), as shown in Table 10.

Table 10: Distribution of respondents according to amount of annual production (Kg / palm) and its relationship to cognitive awareness level:

Amount of Production	Number of Farmers	%	Awareness Mean Score	Pearson Coefficient	Calculated T
45-59	7	7.6	25.4	0.460 **	43.344
60-74	66	71.7	25.2	Significant at Level 0.01	
75 +	19	20.7	26.3	-	
Total	92	100		X = 66.41 S.D = 8.397	

el:

It follows from the table above, that the highest mean of respondents' cognitive awareness of major insect pests infecting date palm is 26.3, falling within the category (75 over), with a percentage of 20.7%, and the lowest mean is 25.2, falling within the category (60-74), with a percentage of 71.7% .

To determine the relationship between respondents' cognitive awareness level of major insect pests infecting palms, dates and the amount of annual production, Pearson coefficient was used, the resulting value of which was 0.460, indicating a relationship between the two variables. To verify relationship significance (t) test was used. The calculated (t) value was 43.344, which was higher than its tabular value amounting to 2,652, at a level of 10.0. This indicates a significant relationship between the two variables. Thus, the research hypothesis stating a significant relationship between farmers' cognitive awareness and the amount of annual production is approved.

Recommendations:

Based on the research findings, the following recommendations were made:

- 1 - Setting up extension programs to identify major insect pests infecting palms, dates, focusing in particular on pests most prevalent in the research area.
- 2 – Focusing attention on activities and extension services aiming at/ relating to palms, dates cultivation in order to make farmers aware of pests and their harmful characteristics, as well as the types of pesticides used to fight them.

Sources: -

- [1]. Jubouri, Ibrahim Jaddou, 2007, inventory and diagnosis of the vital factors in date palm environment, and approval for the development of an integrated pest management program in Iraq, palm, research published in the Journal of the University of Aden of Natural and Applied Sciences, Volume 11, Issue 3.
- [2]. Al-Janabi, Thamer Ni'ma Hamad, 2002, palm farmers' application level of the recommendations relating to major scientific palm service operations in Iraq, master thesis, unpublished, Department of Agricultural Extension and Education, Faculty of Agriculture, University of Baghdad.
- [3]. Al-Sakran, Mohammed bin Suleiman and Siddiq Tayeb Munir, 2006, the adoption of palm tissue technology among date, palm farmers in the Central Region in Saudi Arabia, Search No. (145), Research Center of The College of Food and Agricultural Sciences, King Saud University, p (1 - 20).
- [4]. Abbas Jassim Abdul Aziz and others, 2011, the level of farmers' knowledge of symptoms and methods of prevention and control of the insect Lesser date moth in Khalis, Diyala province, Diyala Journal of Agricultural Sciences (3,1:168-175).
- [5]. Abdul Hussein, Ali, 1974, date, palm pests and combating methods in Iraq, first edition, the University of Baghdad, Iraq, p.7.
- [6]. Abdul Hamid, Mohammed, 2000, scientific research in media research, Helwan University, the world of books, p 354.
- [7]. Obaidat, Thuqan, 2003; Scientific Research, concept, tools, methods; Amman, Ishrakat for publication and distribution, p 031.
- [8]. Food and Agriculture Organization, statistics, 2002.
- [9]. The Arab Organization for Agricultural Development, 1996, the national meeting of officials of fruit trees to discuss and document a national project for the development of fruit trees and protection in the Arab World, Beirut, pp. 11.
- [10]. The Ministry of Planning and Development Cooperation of Iraq, the Central Agency for Statistics and Information Technology, 2006, a prospectus for the production of dates by the province.
- [11]. Hugail, Saud Hamad, 2005, the problems faced by producers of dates, Majma'a, Saudi Arabia, master thesis, King Saud University, College of Food and Agricultural Sciences, Department of Agricultural Extension and Rural Community, pp. 62-65.
- [12]. Al-Odabi I., M.Al-Saab. 2002. A Study of Knowledge Level of Extension Workers and Farmers of the Important Insect Pests of Palm in Riyadh Region in the Kingdom of Saudi Arabia. Journal of King Saudi University Agricultural Sciences Vol. 14, No 1.
- [13]. Zaid A. 2000, The World Date Production: A Challenging Case study UAE University & United Nations Office for Project Services / UN p. 905.
- [14]. Chao, C., R. Krueger. 2007. The Date Palm (Phoenix dactylifera L.): Overview of Biology, Uses, and Cultivation, HortScience: a publication of the American Society for Horticultural Science. V. 42, No. 5, p. From 1077 to 1082. -FAO (2002 and 2003) Agro-Statistics Database15
- [15]. R. Fazal, M.Ibrahim. 2006, Role of Extension agent in the diffusion of palm cultivation in the District Panjgur (Balochistan), Sarhad Journal of Agriculture, CABI Abstract.
- [16]. The Iraq Marshlands Restoration program, 2004, United States Agency for International Development.
- [17]. Al-Shahib W., J. Richard. 2003. The fruit of the date palm: its possible use as the best food for the future? International Journal of food sciences and Nutrition, London, Vol.54, No.4, P.247-259.
- [18]. <http://www.iraqi-datepalms.net/uploadedfiles/DrFouron.doc>.19-