

**THE KNOWLEDGE LEVEL OF EMPLOYEES WORKING IN NINEVEH
AGRICULTURE DIRECTORATE WITH THE VIRAL DISEASES
SOLANCEAE FAMILY**

**Asmaa Zuhair AlHafidh Lubna Laith Mal Alla Salah Al-din Abd Al-Qader
Husain Ali Husain
Mosul University, Nineveh education Directorate, Nineveh Agriculture Directorate
Thy Qar University .
husein@utq.edu.iq**

ABSTRACT

The research aims to determine the knowledge level of employees working in the Nineveh Agriculture Directorate for the viral diseases solanaceae family, finding differences in the knowledge level of them according to some personal and functional factors: age, gender, educational attainment, specialization, job title, service's duration, number of honors, training courses, years of experience with viral diseases, number of infections that exceeded and sources of information regarding viral diseases. Data was collected using a paper mail questionnaire and by internet technique; the first part include: independent factors scale, while the second part include: a test of knowledge level consists of 31 paragraphs distributed on 6 areas: Methods of virus transmission, The symptoms that appear on infected plants, Methods of virus diagnosis, viral diseases, Changes that occur in the tissues of plants infected with the virus, and Methods for protecting plants from viral diseases. Content validity & extreme comparison have been used to test validity; reliability coefficient has been tested using Kuder Richardson 0.78; also the paragraphs discrimination & difficulty coefficient have been found. The research sample consists of 113 employee; data were analyzed using: Mean; Kruskal Wallis; Mann Whitney test. Results show that 56.63 % of employees have high knowledge; a higher knowledge level in methods of virus transmission. The result shows that there are no significant variances in knowledge level according to all factors except specialization.

Keywords: Knowledge level, viral diseases, Solanaceae family

المستوى المعرفي للموظفين العاملين في مديرية زراعة نينوى للأمراض الفيروسية التي تصيب العائلة الباذنجانية

أسماء زهير الحافظ¹ لبنى ليث مال الله² صلاح الدين عبد القادر³ حسين علي حسين⁴
جامعة الموصل كلية الزراعة والغابات¹ مديرية تربية نينوى² مديرية زراعة نينوى³ جامعة ذي قار كلية الزراعة
والاهوار⁴
husein@utq.edu.iq

المستخلص

يهدف البحث الى تحديد المستوى المعرفي للموظفين العاملين في مديرية زراعة نينوى للأمراض الفيروسية التي تصيب العائلة الباذنجانية ، و ايجاد الفروق المعنوية في المستوى المعرفي لهم بحسب بعض العوامل الشخصية و الوظيفية : العمر، الجنس، المستوى التعليمي ، التخصص، العنوان الوظيفي، مدة الخدمة ، عدد التكريمات، الدورات التدريبية، سنوات الخبرة بالأمراض الفيروسية ، عدد الاصابات التي تم معالجتها وكذلك مصادر المعلومات المتعلقة بالأمراض الفيروسية . تم جمع البيانات باستخدام الاستبيان البريدي والالكتروني باستخدام الانترنت .حيث تضمن البحث جزئين : الجزء الاول مقياس العوامل المستقلة والجزء الثاني تضمن اختبار المستوى المعرفي الذي تكون من 31 فقرة موزعة على 6 مجالات معرفية هي: طرق انتقال الفيروس، الاعراض التي تظهر على النباتات المصابة ،طرق تشخيص الفيروس، الامراض الفيروسية التي تصيب النباتات ، التغيرات التي تحدث في انسجة النباتات المصابة بالفيروس، طرق حماية النباتات من الامراض الفيروسية . تم استخدام صدق المحتوى وصدق المقارنات الطرفية لاختبار الصلاحية ؛ولإيجاد الثبات تم استخدام اختبار كودر ريتشاردسون 0.78 كذلك تم التأكد من قوة تمييز الفقرة ومعامل صعوبة ، تم تحليل البيانات باستخدام المتوسط الحسابي و اختبار كروسكال والس واختبار مان وتني واظهرت الفقرة نتائج الاختبار 56.63 % من الموظفين الزراعيين يمتلكون معارف مرتفعة في الامراض الفيروسية التي تصيب العائلة الباذنجانية وان المجالات التي احتلت المرتبة الاولى: طرق انتقال الفيروس، الاعراض التي تظهر على النباتات المصابة كذلك اظهرت النتائج عدم وجود اختلافات معنوية في المستوى المعرفي للموظفين الزراعيين باختلاف جميع العوامل المستقلة المدروسة باستثناء عامل التخصص .

الكلمات المفتاحية: المستوى المعرفي ، الامراض الفيروسية ، العائلة الباذنجانية

INTRODUCTION

The Solanaceae family is very important, most of it is used as food like tomato, eggplant, cucumber, potato, Green, and red pepper, some of which are used as medicinal drugs such as drunken (sugar plant) and datura .(Al Mayah, 2001) Family Solanaceae is a large and important economic family; included important

food, drug plant, and spice. (Al-Saadi et al., 2020). The losses resulting from viral diseases are an important part of the loss caused by pests in general, as viral diseases can reduce the amount of production of vegetable crops belonging to the Solanaceae family by 90% as well as the difficulty of resisting them. (Palukaitis and Arenal, 2003). For example, the pepper crop, issued by the American plant Pathology association 2003, indicated that it is possible to infect peppers with about 17 species of virus, most of which are registered in California. (Laemmlen, 2004). and also, Virus Mosaic Cucumber (CMV) is one of the most important viruses that infect economic vegetable crops, including pepper, cucumber, tomato, zucchini, pumpkin, eggplant, tobacco. (Al-Harris and Al-Fadl, 2017) The right use of the chemical pesticide is the final target to avoid damaged on the human ,animal and environment (AlHajar, 2014) it is possible to this research to be useful to the employees in agricultural extension through putting the plants , programs and extensional activities and transfer it to the farmers a (Abass, 2020) The treatment of losses resulting from viral diseases in Iraq in general and specifically in the Nineveh Governorate is a difficult issue because of the limited information available and the lack of studies that aim to quantify these losses quantitatively and accurately, when reviewing studies related to agricultural pests in many developing countries, including Arab and Iraq in particular, we find that they focus on the impact of each pest separately, As for viral diseases, they are mentioned in plural form under "viral diseases" or even other diseases, The reason is due to the lack of experience in accurately identifying viral diseases, as their symptoms are subtle and not clearly visible. Many viruses cause a general weakness in growth, small size and a small number of fruits, in addition to shortening the life of the plant, and these all do not capture the attention of the farmer or agricultural engineer to the presence of a specific risk, as is the case with fungal or insect diseases that cause apparent severe symptoms, The general weakness of plant growth causes a loss in economic returns. In addition to the study of viruses requires specialized training and expensive devices, and may not be available Nineveh Governorate, from a source to an importer of most crops, including vegetables, weak competitiveness in foreign markets, as well as poor food security, a lack of job opportunities, and a weak income for citizens. This is due to the lack of information and agricultural extension, which is considered one of the most important basic obstacles to any objective and comprehensive study of the impact of infection with viral diseases, and therefore the proportion and severity of infection in the coming years will be

large, so priorities must be set for scientific research activities and agricultural extension for agricultural employees working in agricultural institutions as well as for farmers and an assessment of the extent of the success of the control methods used in joining the production of crops, including the crops of Solanaceae family. The matter requires identifying the extent to which employees knowledge of viral diseases in agricultural research centers and agricultural extension institutions, and the question of the actual knowledge level of employees in this area to emphasize the high knowledge and strengthen the weak & median knowledge, the researchers decided to refer to some research related to the knowledge relationship of the farmer and the viral diseases solanaceae family. A study (Jasim et al., 2012) shows that the knowledge level of agricultural employees is average and there is a significant correlation between the level of knowledge of the employees of each of the sex, educational level, specialization, desire to work, number of courses, and no moral relationship with each of the age, number years of work. Likewise, a study (Fathy, 2013) shows the weakness of the knowledge level of agricultural employees and the existence of a discrepancy in the knowledge level of agricultural employees according to the difference of each of the instructional methods, the tendency towards extension work, and the absence of a discrepancy in the knowledge level of agricultural employees according to the difference in age, academic qualification, duration of employment service. Duration of work in indicative posts. Also, the study (Al-khafaf, 2013) shows that employees' knowledge was medium and tended to decline with a significant correlation between the level of knowledge of agricultural employees in terms of level of education, work location, job service period, sources of agricultural information while there was no moral relationship with both origins, specialization. Likewise, the study (Saleh and Asmaa, 2019) shows that the knowledge level of agricultural employees in control of leaf digger insect on tomatoes was medium and tended to decline in general and there is no significant difference in the knowledge level according to the different period of employment service, the degree of pursuit of modern ideas, approved agricultural information sources, It was also found that there is a significant difference in the level of knowledge according to the educational level and academic specialization, also study of, as clear in the more previous studies there is medium and low levels of knowledge, and there are moral relationships with some factors and not moral relationships with others, some of these agree with study results and disagree with others. This research aims to:

- 1- Determine the knowledge level of employees working in the Nineveh Agriculture Directorate for the viral diseases solanaceae family through :
 - a- Estimating the knowledge level in general for the employees working in the Nineveh Agriculture Directorate
 - b- Ordering the knowledge level of the employees working in the Nineveh Agriculture Directorate according to the following areas: methods of virus transmission ‘the symptoms that appear on infected plants‘ methods of virus diagnosis, viral diseases‘ changes that occur in the tissues of plants infected with the virus, and Methods for protecting plants from viral diseases
 - c- Arrangement of the paragraphs of each area of the level of knowledge of the employees working in the Directorate of Nineveh agriculture for the viral diseases solanaceae family
- 2- Finding differences in the knowledge level of employees working in the Nineveh agriculture Directorate for the viral diseases solanaceae family, according to some personal and functional factors, age, gender, educational attainment, specialization, job title, service’s duration, number of honors, training courses, years of experience with viral diseases, number of infections that exceeded and sources of information regarding viral diseases.

MATERIALS AND METHODS

The researchers followed the descriptive method using the method of survey studies because it is appropriate to the nature of this study. The research community consists of all the employees 487 in Nineveh Agriculture Directorate. The researchers selected a sample from each division of directorate, from type Quota sample (AL-Abbasi, 2018) which used when taking the same ratio from each class and same it from the society of the research with ratio 23 % a number 113 employee as in table (1).

***Table 1. The institutions of the research community and its 'samples**

Sequence	The institution	Research Community	Sample	%	Sequence	The institution	Research Community	Sample	%
1	Agricultural Research Department	43	10	23	13	Branche Makhmoor	22	5	23
2	Division Seed Inspection and Certification	22	5	23	14	Branche Faida	22	5	23
3	Division Plant Protection	39	9	23	15	Branche al Queer	39	9	23
4	Division Vegetable production	17	4	23	16	Branche Zomar	17	4	23
5	Division Planning	13	3	23	17	Branche Alayadia	22	5	23
6	Division Grain	22	5	23	18	Branche Basheeqa	9	2	23
7	Division Counseling	43	10	23	19	Branche Qayyara	23	6	23
8	Division Laboratory Center	17	4	23	20	Branche	22	5	23
9	Devison Tomato and eggplant development project	39	9	23	21	Branche Alqosh	22	5	23
10	Division Forest gardening station	17	4	23		* Nineveh agriculture Directorate/ 2020			
11	Branche Cultivation of sheikhs	4	1	23					
12	Branches Cultivation of Hamedat	13	3	23	The summation		487	113	

A questionnaire consisted of two parts, the first part is personal factors are: Age, gender, educational attainment, specialization, job title, service's duration, number of honors, training courses, years of experience with viral diseases, number of infections that exceeded, and sources of information regarding viral diseases. The second part of the questionnaire is included of the knowledge level test were primarily 45 paragraphs, which covered six areas of knowledge: Methods of virus transmission (6)paragraphs, The symptoms that appear on infected plants 5 paragraphs, Methods of virus diagnosis

5 paragraphs, Viral diseases 5 paragraphs, Changes that occur in the tissues of plants infected with the virus 5 paragraphs, and Methods for protecting plants from viral diseases 5 paragraphs, the total number of these paragraphs in the test were finally 31 paragraphs. The content validity was tested by submitting the questionnaire to several experts of the department of prevention/ College of agriculture and forestry/ Mosul University, besides that, extreme comparisons were used by applying the test on a random sample of 30 employees during (was excluded from the final sample) after correcting the test the scores were divided into two halves, the higher and lower group then an arithmetic means were found from both groups and compare of them using T-test the value of the calculated T is 8.1 degree, which is the larger than tabular T value at 5% significance level, indicating that the test has the ability to discriminate between both groups with high and low knowledge level (1). Then reliability tested by applying the Kuder-Richardson equation was also found on the same sample, the value of reliability coefficient 0.78 which demonstrated acceptable reliability of the test. It was found the discriminatory power of the instrument as amended paragraphs that ranged from 0.2 – 0.29 and paragraphs with less value 0.20 were neglected, so it has been found the coefficient of difficulty; it was deleted paragraphs that occurred outside the range 0.20 – 0.80 thus numbered paragraphs at the final test about 31 of the following types: multiple choice paragraphs; there are three alternatives to answer one of them chosen by the respondent, also paragraphs of true or false and completion paragraphs the respondent complete the lack, supplemented to the information, this part has been corrected by giving (1) to the right answer and (0) to the wrong answer less value 8 high value 29. Then after data collecting, and analyzed by using the Statistical Analysis program (SPSS) for social sciences (Masaody, 2020). using Statistical Means: the percentage, standard deviation, arithmetic mean and median, Mann Whitney for factors which divided into two categories, Kruskal-Wallis for factors which were divided into three categories and more (Tharwat, 2004). The knowledge levels were determined by summing the degrees of all knowledge areas and statement, data has been collected during the period 8-20 September 2020 using email.

RESULTS AND DISCUSSION

1- First: Determine the knowledge level of employees through:

a-Estimating the knowledge level in general for the employees working in the Nineveh Agriculture Directorate table [2] shows :

Table 2. Distribution of employees according to knowledge level in the viral diseases solanaceae family

* Knowledge categories	Number	%
Low (8-14) degrees	6	5.30 %
Medium (15-21) degrees	43	38.05 %
High(22 and more) degrees	64	56.63 %
The total	113	100 %

*Categories were divided depending on actually Range & category length

lesser value = 8 highest value = 29 Mean =21.37 standard deviation = 4.15

As demonstrated in table [2] the knowledge level in the viral diseases solanaceae family is high in the first followed by medium category and low category that maybe because employees in Nineveh Agriculture Directorate depend on each other to receive information of Solanaceae Family and need to support their knowledge and increase concerns in some areas because developing new knowledge constantly and developing day after day.

b-Ordering the knowledge level of the employees according to the following areas: table [3]

Table 3. Ranks of the areas according to the arithmetic Mean of employees knowledge level

The knowledge areas	Arithmetic Mean	Ranks
First: Methods of virus transmission	4.84	1
Second The symptoms that appear on infected plants	4.18	2
Third Methods of virus diagnosis Viral diseases	3.64	3
Fourth Changes that occur in the tissues of plants	3.48	4
Five infected with the virus	2.92	5
Six Methods for protecting plants from viral diseases	2.28	6

As clear in table 3 the highest level of knowledge of employees are the methods of the symptoms that appear, which indicate that employees have advantages knowledge in these areas may be because they have tasks in their jobs help them to learn. While infected with, Methods for protecting mean that employees need to provide information in these areas to improve their performance

c- Arrangement of the paragraphs of each area of the level of knowledge of the employees: As table (4)

Table 4. Ranks of the paragraphs according to knowledge level Mean

The knowledge paragraphs		Mean	Ranks
1	Host conditions in the living of the virus	0.990	1
2	Damage by infection with viral diseases in the affected fields	0.982	3
3	possibility of virus development in industrial environments	0.982	3
4	Symptoms vary according to the type of virus and host	0.982	3
5	The parts that appear on the viral infection in tomato	0.982	5.5
6	Virus transfer methods	0.982	5.5
7	Diagnosis of injury first disease appearance	0.964	7
8	The multiple uses of the Solanaceae family	0.946	8
9	Forms of presence Solanaceae family in Iraq	0.928	9
10	Virus description	0.866	10
11	The most famous viral diseases	0.860	11
12	The effect of the virus on the infected plants	0.830	12
13	Symptoms of infection on tomato crop	0.821	13
14	The Common factor between infecting tomato and potato	0.803	14.5
15	Methods of viruses reproduce	0.803	14.5
16	Symptoms of tomato infected with the virus	0.785	16
17	Preventive measures to prevent virus diseases	0.776	17
18	The most famous insects, vectors of disease	0.767	18
19	The benefit of insecticides in treating these viruses	0.758	19.5
20	Symptoms of potato infected with virus	0.758	19.5
21	Emphasis on prevention by vaccinating a weak strain	0.723	21

22	Methods to get the virus from the beginning	0.714	22
23	The most accurate method to virus diagnoses	0.696	23
24	The best method to estimate the virus-infected ratio in the farm	0.669	24
25	Methods of virus transfer from infected to the healthy plants	0.625	25
26	Virus shapes	0.598	26
27	Most important diseases which infected Solanaceae family	0.544	27.5
28	The clear changes in the infected plants stromal	0.544	27.5
29	Diagnose methods the virus	0.410	29
30	Clear symptoms on the infected plants in general	0.226	30
31	The effect of virus diseases on the seeds	0.226	31

As clear in table 4 the highest level of knowledge of employees is the host conditions in damage caused by infection which indicates that employees have useful knowledge in this area, that required enhance & support of the employees in these paragraphs. While clear symptoms on the infected, the effect of virus diseases, mean that employees need to provide information in these paragraphs to improve their performance

Second: Finding differences in the knowledge level of employees, according to some personal and functional characteristics:

Table 5. Difference in the knowledge level according to several factors

Factors		N	%	Median	Ave Rank	H Value	W Value	P Value
Age	Young(20-29)	4	3.53%	23.5	74.5			
	Medium(30-39)	53	46.9%	22	57.3			
	Old (40-49)	31	27.4%	23	57.7	1.83	----	0.6 N.S
	The oldest(50-59)	25	22.12%	22	49.6			
Gender	Male	69	61.06%	23	48.9			
	Female	44	38.93%	20	54.6	-----	4196.0	0.12N.S
Education	School	2	1.76%	28	108			
	Institute	14	12.38%	20.5	44.5			
	College	70	61.94%	23	58.6	7.07	-----	0.13 N.S
	Master	25	22.12%	22	55			
	Doctorate	2	1.76%	15	9			
Specialization	Plant protection	41	36.28%	23.5	71.6			
	Horticulture	43	38.05%	21	49.5	10.87	----	0.04*
	Various	29	25.66%	24	71.4			
Job title	As. Engine..	19	16.81%	23	64.3			
	Engineer	59	52.21%	22	53.4			
	Older engine	19	16.81%	23	61.2	2.48	-----	0.47N.S
	Chief engine..	16	14.15%	21.5	50.5			
Service	Small (1 - 2)	22	19.46%	23	42.2			
	Medium(3- 4)	60	53.09%	25	55	9.17	-----	0.24N.S
	Big(5and more)	31	27.43%	24	43.2			
Honors	Small (0-1)	89	78.76%	24	54			
	Medium(2-3	16	14.15%	22	59.1	3.64	-----	0.72N.S
	Big(4and more)	8	7.07%	26	80.3			
Trai...courses	Small (0)	90	79.64%	22	57			
	Medium(1- 2)	21	18.58%	22	50	1.26	----	0.73N.S
	Big (3 - 4)	2	1.76%	17	35			
Experience	Small (0-1)	45	39.8%	24	43.9			
	Medium(2-3)	38	33.62%	25	27.8	1.93	----	0.9N.S
	Big(4& more)	30	26.54%	22	44.5			
Infections	Never(0)	88	77.8%	23	47.1			
	Small (1)	10	8.84%	22	54.3			
	Medium(2)	8	7.07%	21	50	4.66	-----	0.26N.S
	Big(3 and more)	7	6.19%	24	60			
Sources	Small (1- 2)	48	42.47%	20	45.2			
	Medium(3-4)	27	33.62%	24	71.8	9.76	----	0.2 N.S
	Big(5and more)	38	23.89%	19	53.4			

Significant at 5%

CONCLUSIONS

1-The vast majority of employees have high knowledge of viral diseases, that is 94.68 % from employees were within two categories; high and medium knowledge, this due to that the employees have an awareness & experiences to receive every development and ready to solve any problem in their areas.

2- There is a lack of employees' knowledge particularly in a paragraph of the effect of virus diseases on the seeds followed by Clear symptoms on the infected plants in a general paragraph in comparison with other paragraphs; which required more knowledge and rich experience in these paragraphs particularly.

3- Focus on the specialization of the employees as an important factor to increase the knowledge of employees in the viral diseases.

4- All of the factors in this research (except the specialization)show a weak role in increase the knowledge of employees in viral diseases.

RECOMMENDATIONS

1-Strengthening the advisory role and setting up training and extension courses and programs for agricultural employees to develop their skills, increase their knowledge of modern methods of managing viral diseases and methods of combating them, and increase their knowledge of diseases that afflict the Solanaceae family.

2-Promote and strengthen the degree of cooperation between agricultural circles and international agricultural societies in diagnosing and treating plant diseases in general and viral diseases in particular.

3-Providing the Internet in government decisions and laboratories in order to communicate with international agricultural societies.

REFERENCES

- Al-Abbassi , A.F. 2018. Methods of scientific research and statistical Analyses in behavioral sciences, the first print, university of Mosul , Iraq :370 -464.
- Al-khafaf, T. S. H. 2013. the level of knowledge of agricultural extension workers in Nineveh Governorate in the field of organic agriculture and its relationship to some factorss, Al-Rafidain Agriculture Journal, 41 (4):1

- Al-Mayah, A. R. 2001. Botany Taxonomy House of Books and Documents:1
- Al-Saaadi S.A.,A.N.Al-Wheeb and S.S.K.Al-Taie. 2020. Phelogenetic relationship among some species of Solanaceae in Iraq,EurAsian Jornal of BioSciences, 14:2391
- Palukaitis , P., F.G-Arenal . 2003.Cucumo Viruses Advirus Res 62:241-323
- Alhares, A and F.Al-Fadhel. 2017. Detection of cucumber mosaic virus on pepper by indicator plant immune strip and RT- polymerase chain reaction. Faculty of Agriculture. University of Kufa. Republic of Iraq. 9:91-73.
- Laemmlen.F. 2004. Commercial Pepper Production Handbook. University of Georgia College of Agricultural and Environmental Sciences, Center for Agribusiness and Economic:75 .
- Fathi, A. M. 2013. the level of knowledge of agricultural employees in the Nineveh Agriculture Directorate on the basis of selection and implementation of agricultural extension methods, Mesopotamia Journal of agriculture,41 (4):1
- Jasim, M. H., A. A. Ghadeeb and M. K. Ali. 2012. the level of knowledge of agricultural employees working in Silo, Ministry of Trade in Salah al-Din Governorate, and its relationship to some factors, Mesopotamia Journal of agriculture, 40 (2):1
- Saleh, S. A and A. Z. Al-Hafidh . 2019. The level of knowledge of agricultural employees in Nineveh Governorate about the tomato leaf digger Tuta absoluta, some methods of combating them, The Third National Feminist Scientific Conference, 13-14, Baghdad, Iraq: 122.
- Tharwat, M.A. M. 2004. Modern entrance for statistics and prospects, Al obaikan library:1
- Masaody , A.S. 2020. Knowledge level of broiler breeders in Irbel city in breeding process during of the growth and incubation period, Diala Journal for agricultural sciences, (12) special number of actual fourth science & first international conference 15-16/7/2020 :644 .
- Abass, J.A., K. H. M. hasson and K. H. H. AlAzi and H.A. Abas. 2020 . Farmers knowledge level with symptoms protection and treatment of Amydraula palm insect in Al-Khales Diyala Governorate, Diala Magazine for agricultural sciences, 3(1):169.
- AlHajar, M. J. 2014. The general agricultural pesticide, the first print, Al Jawhara house for publishing and distribution: 2 .