



LEVEL OF SPREAD OF PALM TRUNK INJECTION TECHNOLOGY FOR FERTILIZATION AND CONTROL PURPOSES IN ALTARMIYA DISTRICT

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ABSTRACT

The research aimed to identify some of the personal characteristics of the respondents and their agricultural systems (educational level, age, experience in palm cultivation, tenure, the importance of palm in income) and determine the level of spread of palm trunk injection technology for fertilization and control in the Tarmiya district, the research community included palm farmers, who numbered 1708 and distributed as follows (1000 Tarmiya, 495 viewing, 213 Al-Abaiji) A proportional random sample was taken by 7% and by 120 respondents and distributors on (15,35,70) researcher, and to achieve the objectives of the research prepared a questionnaire consisting of two parts, the first part included some of the personal characteristics of the respondents, the second part included (11) paragraph and distributed on 4 areas and 8 axes, was measured according to a bilateral scale (yes, no), was given the following weights (0.1) respectively, used many statistical means of frequencies and arithmetic mean, percentages, and the equation of alpha Cronbach, weighted mean, percentage weight, The results of the research showed that most of the respondents are from the age group of 46-58 years and holders of an intermediate certificate, and have experience of 22-38 years, and own small areas distributed between (3-35) dunums, plant palm trees with small areas distributed between (3-35) acres, and the number of palms is estimated between 20-280 palm trees, and the respondents rely on palm cultivation as the main source of their income, which is 72.5%, and the results also showed that farmers apply technology to all the area of the orchard, which is 95.8%, and that The number of years of application ranges between 4-6 years and by 47.5%, and that the respondents continue to apply the technology by 95.8%, and the results showed that the respondents want to continue to apply the technology by 95.8%, and that the technology of injection of the palm trunk is compatible with the experiences of palm growers and appropriate with their farm systems and by 96.6%, and compatible with the values and customs prevailing in the region by 92.5%, as well as that the respondents have sufficient experience and skills to apply the technology and by 95.8%, and the researcher recommended to Continuing to spread this injection technology because of its role in preserving humans, animals, the environment and beneficial insects such as bees in all governorates of the country, and Increasing interest in technology and increasing government support for farmers by providing this technology and training farmers on how to use it.

Keywords: Technology, Injection Mechanism, Level of Spread.

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مستوى انتشار تقانة الحقن بجذع النخلة لأغراض التسميد والمكافحة في قضاء الطارمية

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الخلاصة

هدف البحث الى التعرف على بعض الخصائص الشخصية للمبوحين ونظمهم الزراعية والمتمثلة (المستوى التعليمي، العمر، الخبرة في زراعة النخيل، الحيازة، أهمية النخيل في الدخل) وتحديد مستوى انتشار تقانة الحقن بجذع النخلة لأغراض التسميد والمكافحة في قضاء الطارمية، شمل مجتمع البحث مزارعي النخيل و البالغ عددهم 1708 والموزعين على كما يلي (1000 الطارمية، 495 المشاهدة، 213 العبايجي) تم أخذ عينة عشوائية تناسبية بنسبة 7% وبواقع 120 من المبوحين و الموزعين على (15،35،70) مبوح، ولتحقيق أهداف البحث أعدت أسبانه متكونة من جزئين، الجزء الاول تضمن بعض الخصائص الشخصية للمبوحين، أما الجزء الثاني تضمن (11) فقرة و الموزعين على 4 مجالات و 8 محاور، تم قياسها وفق مقياس ثنائي (نعم، لا)، أعطيت له الاوزان الاتية (0.1) وعلى التوالي، استخدمت العديد من الوسائل الاحصائية المتمثلة بالتكرارات والمتوسط الحسابي، النسب المئوية، ومعادلة الفا كرونباخ، الوسط المرجح، الوزن المنوي. أظهرت نتائج البحث بأن أغلب المبوحين هم من فئة العمر 46-58 سنة وحاملين شهادة المتوسطة، ويمتلكون خبرة من 22-38 سنة، ويمتلكون مساحات صغيرة موزعة بين 3-35 دونم، يزرعون أشجار النخيل بمساحات صغيرة موزعة بين (3-35) دونم، وتقدر أعداد النخيل بين 20-280 نخلة، والمبوحين يعتمدون على زراعة النخيل كمصدر رئيسي لدخلهم و البالغ نسبتهم 72.5%، كما أظهرت النتائج بأن المزارعون يطبقون التقانة على كل مساحة البستان و البالغ نسبتهم 95.8%، وأن عدد سنوات التطبيق تتراوح بين 4-6 سنوات و بنسبة 47.5%، وان المبوحين مستمرين بتطبيق التقانة و بنسبة 95.8%، كما أظهرت النتائج بأن المبوحين يرغبون بالاستمرار في تطبيق التقانة و بنسبة 95.8%، و ان تقانة الحقن بجذع النخلة متوافقة مع خبرات زراع النخيل وملانمة مع نظمهم المزرعية و بنسبة 96.6%، و متوافقة مع القيم والعادات السائدة في المنطقة و بنسبة 92.5%، فضلاً عن ان المبوحين يمتلكون خبرات ومهارات كافية لتطبيق التقانة و بنسبة 95.8%، وقد اوصى الباحث بالاستمرار في نشر تقانة الحقن لما لها من دور في الحفاظ على الانسان والحيوان والبيئة والحشرات النافعة كالنحل في كل محافظات البلد، وزيادة الاهتمام بالتقانة وزيادة الدعم الحكومي للمزارعين من خلال توفير هذه التقانة وتدريب المزارعين بكيفية استخدامها.

الكلمات المفتاحية: التقانة، الية الحقن، مستوى انتشار.

INTRODUCTION

The agricultural sector is one of the most important sectors in the developing world and in Iraq as a whole (Al-Shibawi, Al-Wasiti, 2022). The development of the agricultural sector and the development of production methods are not only sought by developing countries but have become an urgent need for the overall success of agricultural development. (Salhi, 2016) (Nema, 2019) Agriculture is the main financier of national production in most developing countries and an area of employment and has an impact on the population and their lives. (Al Bayati et al., 2016) Food security is one of the number one major challenge facing global agriculture (FAO, 2015), and to achieve this, widespread strategic objectives require increases in plant and animal agricultural production, which must be achieved at this stage and in the future to meet the widespread and increasing demand for food and agricultural products resulting from continued intensive growth. for the population, which is estimated at between 50.5 million and 2025. (Al-Hakim, 2013). The development of agricultural production and productivity by achieving self-sufficiency in the country and agricultural production is a primary goal sought by all countries, including Iraq, and has contributed significantly to achieving sustainable food security and the national economy, because it is considered an important source of the national economy in many countries of



the world, by exporting large quantities to the countries of the world and providing hard currency, in addition to contributing to the development of GNP along with contributing to the development of the national economy while developing the contributing agricultural sector as a percentage of GDP (Fatlawi, 2018). Date palm cultivation needs a lot of preventive cultivation activities to protect it from pests and diseases in order to increase date palm production and achieve this development (Al-Shuwaili, 2022). Agricultural technology and modern technologies are only a means and not an end themselves, and therefore achieving the desired goals requires a large-scale launch of this program. E techniques in the field of farmers and their application according to scientific advice, as well as the so-called green revolution that the world is witnessing, especially in Asia, America and Europe, the development of agricultural techniques characterized by high productivity and as a result of their widespread spread in the fields of millions of farmers (FAO, 2011) (Shaaban, 2016). The need for modern technologies has increased a lot in our time (Al-Khafaji, Al-Badri, 2016) and scientific and technological progress and the creation of modern technologies are among the main reasons for the occurrence of economic and social development (Abdul Razzaq and Salman, 2018) Modern technology has become a standard that determines the progress of nations and countries, but more than that, it has become seen as a source of wealth and an important factor for Promote social and economic development.(Abdul wahab,b,2012). The dissemination of agricultural technologies is an activity and a basic service of increasing interest and impact in the agricultural sector in most countries, including Iraq, because it is related to meeting the technical needs of farmers, addressing the problems of their agricultural activities, increasing productivity and agricultural production, improving its quality, increasing its economic returns and meeting the needs of society from food security. (Al-Taie, 2009). As the dissemination of technologies is an organized process consisting of three main activities (research, extension, processing) and includes a series of events, namely the selection of the appropriate technology for the targeted agricultural systems, introducing farmers to the technology and its advantages, convincing them to adopt it, providing them with the knowledge and skills necessary for its application, equipping them with it and the requirements for its application, and following up the application to achieve its spread in the targeted agricultural systems (Al-Tai, 2013). Therefore, achieving the effective spread of these technologies requires the existence of plans and strategies as well as planned programs involving the relevant authorities for research, processing, agricultural and extension services, and some institutions can be governmental and private in many developing countries or can be the private sector or agricultural companies and have a role in this process, especially through the supply of technologies or the provision of extension activities, and this is a marginal trend. There is an increasing increase in the field of agricultural development work in order to ensure the achievement of the desired goals (Al-Hilfi, 2014). The level of spread achieved in any agricultural development, including the technology of palm injection in farmers' orchards - and the speed of the technology's spread, sustainability and productivity (the area on which it is deployed, the number of adopters, the time it takes) (Rogeres, 2003). It is the result of the interaction of interrelated factors, including the characteristics of technology, farmers, the publishing plan, their farm systems, the organization of the publishing process, the level of effectiveness of providing technology, guidance, equipping farmers with it, services, follow-up, evaluation, and the characteristics of government support and lending (Al-Tai, 2006). Modern agricultural technologies aim to change the style and practices of

farms from traditional practices and provide them with advanced agricultural knowledge and skills and positive trends, and all these factors contribute to increasing the rate of adoption and application of these technologies. (Hatem, 2016) Based on the importance and advantages of this technology (palm trunk injection technology) and the country's need to develop palm tree service operations and increase its productivity and sustainability of dates as one of the basic components in achieving sustainable food security for members of society, the Ministry of Agriculture, through a number of formations, has deployed this technology in 2014 in many governorates where palm cultivation is widespread, which represents an activity for youFarmers and their families and a main source of income (Public Authority for Prevention 2016). Agricultural extension is also a system that ensures that farmers and their organizations have access to sources of information, knowledge and technologies and facilitate their communication and interaction with the relevant authorities. (Al-Hafiz, Al- Tai, 2022) Due to the importance of this technology, this research came to determine the spread of this technology, the number of farmers adopting this technology, and the agricultural areas in the research area.

Therefore, this research came to answer the following questions, including:

- What are the characteristics of the respondents and the nature of their agricultural systems?
- What is the level of spread of palm stump injection technology for fertilization and control purposes in Tarmiya district / Baghdad governorate?

Research aims:

1. Identifying some of their agricultural characteristics and systems (educational level, age, agricultural experience in palm cultivation, tenure, and the importance of palm trees in income).
2. Determining the level of spread of the injection technology of the palm trunk for the purposes of fertilization and control of palm pests in the district of Al-Tarmiya.

Operational definitions:

Technology: An agricultural innovation designed to facilitate the implementation of date palm control and fertilization in the Tarmiya district in a faster and accurate manner.

Injection technology: A machine used by palm farmers in the Tarmiya district to control and fertilize palm trees.

Injection mechanism: A mechanism used to control diseases that affect palm trees in the district of Tarmiyah and to add nutrients.

Dissemination of injection technology: The process of facilitating the access of technology to the target audience in order to adopt and apply it on a large scale.

First - the research method

I used the field survey method to achieve the objectives of the current research because it is appropriate in obtaining data related to this field (Saleh, 2004), and it branches out from the descriptive approach in social research (Melhem, 2000).

Secondly, the research community

Al-Tarmiyah District was chosen from Baghdad province as an area to conduct the research for two reasons:

- 1- The presence of a large number of palm groves in this district.

2- The technique of injection with the trunk of the palm tree was applied in this area. The research included all date palm farmers in the province of Baghdad (Al-Tarmiyah district), who numbered (1708) farmers, distributed among three divisions within the Directorate of Agriculture of the province (Al-Abayji, Al-Mashada, Al-Tarmiyah).

Third - the research sample

Proportional random sample of 7% was selected from the total number of 1708 date palm farmers in Baghdad / Al-Tarmiya district, distributed among three agricultural divisions within the district (Al-Tarmiya Center *, Al-Abaiji *, Al-Mashahid *) so that the sample size was 120 respondents, as shown in the table number. (1).

The sample size would be 120 respondents, as shown in the following table.

Table (1): Distribution of the respondents among the agricultural divisions of Al-Tarmiya district.

district	Agriculture Division	Farmer numbers	percentage (7%)	Final numbers after rounding	%
Altarmiya	Al-Taramia Division	1000	70	70	58.4
	Al-Abayji division	495	34.6	35	30
	Almushahada division	213	14.9	15	11.6
	Average	1708	120	120	100

Fourth - Data Collection Tool:

The questionnaire was adopted as a means of obtaining information from the respondents in order to suit it with the nature of the research and the data required to obtain it, as the questionnaire is considered an appropriate tool for collecting data because it is more objective than other means of collecting data to achieve the objectives of the research.

1. Scientific literature related to the dissemination of agricultural technologies.
2. The annual reports of the palm tree injection campaign issued by the Ministry of Agriculture
3. Meetings with the workers in the campaign (administration and researchers) affiliated with the General Authority for Plant Protection
4. Opinions of a group of field specialists in plant and soil protection, horticulture and agricultural extension, as experts are considered one of the main sources in building the scale.
5. View the studies in agricultural extension and research in the protection of crops and horticulture

In the light of the above, the researcher prepared a preliminary questionnaire that includes two parts, the first part includes a description of the respondents and their agricultural



systems, which includes (8) paragraphs, and the second part includes (11) paragraphs to determine the level of spread of the injection technology of the palm trunk in Al-Tarmiya district h, in the light of the meaning of the spread of agricultural technologies. And the prevalence indicators mentioned in some studies, including (Al-Taie 2013 study), four indicators of prevalence were identified, which are:

1. Number of implementers of agricultural technology (%).
2. The area where the technology is applied (%).
3. Sustainability of technology application (years of technology application).
4. The future direction of technology sustainability.

Fifth - the scale validity

The apparent validity of the scale was examined by presenting it after the completion of the measurement tool to a group of experts in agricultural extension to measure the apparent validity and experts and specialists in horticulture and prevention to measure the validity of the content. A preliminary test (pre-test) was conducted in (11) months. /2022) on a sample consisting of (15) respondents taken from Al-Tarmiya district- Baghdad provainc. The stability of the questionnaire was measured using Cronbach's alpha equation, and the stability coefficient was (0.90), where all the statements were characterized by high stability. Data were collected during a period from (12/2022 to 1-2023) using the personal interview method. The following statistical tools were used (frequencies, percentages, arithmetic mean, Cronbach's alpha equation, weighted average, weight percentage).

Sixth: quantifying the scale

The researcher used a binary scale (yes, no), and the following weights (0, 1) were given, respectively, for all (11) paragraphs to determine the level of spread of the palm stem injection technology in Al-Tarmiyah district.

Results and discussion

The first aim: - to identify the social and economic characteristics of the respondents: -
1_ The educational level: The results of the research showed that the majority of the respondents are middle school graduates with a rate of 30%, then college graduates with a rate of 27.4 %.
Then middle school graduates with a rate of 22.5 %, then reading and writing with a rate of 8.5 %, then the honest respondents had a percentage of 6.6%, while the respondents had high school diplomas with 5%, and this percentage is very low, as in Table No. (2)

**Table (2):** Distribution of respondents according to educational level

Educational level	Number of farmers	percentage
Illiterate	8	6.6
Reads and writes	10	8.5
Medium	36	30
Prep	27	22.5
College	33	27.4
Master's Degree	6	5
Average	120	100

We conclude from the above table that the majority of the respondents are educated and are good at reading and writing, and this is a positive factor that helps the farmer to read the instructions for using pesticides and fertilizers and the quantities specified by the producing companies and how to use the injection technology correctly on palm trees and to learn about the advantages and benefits of technology in the fields of control and fertilization as well On the environmental effects resulting from the use of technology.

2- Age: The results showed that the category of respondents whose ages ranged from (33-45) years came in the first place with a rate of (33.5 %), then the category of respondents (20-32) years came in the second place with a rate of (32.7 %), then the category The respondents (46-58) years came in third place with a rate of (27.6 %), then the category of respondents (59-71) came in the last place with a rate of (6.2%), as in Table. (3).

Table (3): Distribution of respondents according to age groups.

No.	age (year)	Number of farmers	percentage	Arithmetic average	standard deviation
1	20-32/year	39	32.7	22	6.2
2	33-45/year	40	33.5		
3	46-58/year	33	27.6		
4	59-71/yea	8	6.2		
	average	120	100		



We conclude from the above table that most of the respondents are young and middle-aged, and these groups are characterized by their acceptance of new ideas and developments, and they accept everything new in their field of work and application in order to develop their agricultural production.

3- Experience in palm cultivation and orchard management: The results showed that the category of respondents with experience ranging between (22-37) years came in the first place with a rate of (60%), then the category of respondents (38-53) years ranked second with an average of (27.5%) Then the category of respondents (5-21) years, with a rate of (12.5%), as shown in Table (4).

Table (4): Distribution of respondents according to categories, years of experience in palm cultivation and orchard management.

Years of experience in palm cultivation and orchard management	Number of farmers	percentage	Arithmetic average	standard deviation
5-21/year	15	12.5	32	2
22-37/year	72	60		
38 - 53 / year	33	27.5		
Average	120	100		

Years of experience in palm cultivation and orchard management, We conclude from this that the majority of the respondents have sufficient experience to know the diseases that affect date palms, methods of controlling them, types of fertilizers, various methods of control, fertilization, and palm service, in addition to sufficient information on how to use injection technology in the control and fertilization processes because of their role in preserving human and animal health in particular. environment in general.

4- A- Possession: The results showed that the category of respondents who have possession ranging between (3-35) dunums came in the first place with a rate of (61%), then the category of respondents (36-68) dunums ranked second with a rate of (33%), then the category of respondents (69-101) dunums ranked last, at a rate of (6%), as shown in Table (5).

Table (5): Distribution of respondents according to categories of possession.

categories	The total area of the orchard/dunum	Number of farmers	percentage	Arithmetic average	standard deviation
possession	(3-35)	73	61	43	5.7
little area	(36-68)	40	33		
medium area	(69-101)	7	6		
average		120	100		

It appears in the above table that most of the respondents are holders of small- and medium-sized holdings.

4-b- The area planted with palm trees: The results showed that the category of respondents who have an area planted with palm trees ranging between (3-35) dunums ranked first, with a percentage of (45.8 %), then the category of respondents (36-68) dunums came in the second rank, with a percentage of (37.6 %) Then the category of respondents (69-101) dunums came last with a rate of (16.6 %) as in Table (6).

Table (6): Distribution of the respondents according to the categories of the area planted with palm trees.

tenure categories	Area cultivated with palm trees / dunum	Number of farmers	percentage	Arithmetic average	standard deviation
little area	(3-35)	55	45.8	41	10
medium area	(36-68)	45	37.6		
A large area	(69-101)	20	16.6		
	average	120	100		

We conclude that the majority of the respondents are the owners of small and medium holdings, and that a large percentage of the respondents own orchards of medium size and somewhat large, and this indicates that most palm farmers need modern technologies to facilitate the process of palm service due to the role of these technologies in reducing effort and time in addition to costs.

4- C- The number of palm trees planted: the results showed that the category of respondents who have palm trees ranged between (20-280) palm trees came first with a percentage of (58.4%), then the category of respondents (281-540) palm trees came second with a percentage of (25.8 %) Then the category of respondents (542-802) palm trees with a rate of (15.8 %) ranked last as in Table (7).

Table (7): Distribution of respondents according to the number of palm trees planted in their orchards.

Number of palm trees / dunum	Number of farmers	percentage	Arithmetic average	standard deviation
20-280 palm trees	70	58.4	35.2	31
281-540 palm trees	31	25.8		
542-802 palm trees	19	15.8		
average	120	100		

We conclude from the above table that two-thirds of the respondents own palm trees in their orchards in large numbers, and the greater the number of palm trees in the orchard, the more the farmer is encouraged to use all modern methods that facilitate the palm service process.

5- The importance of date palms in agricultural income: The results showed that palm cultivation is a major source for (87) respondents with a rate of (72.5%) and is a secondary source for (27) respondents with a rate of (22.5%) and is considered a source of little importance for (6) Respondents with a rate of (5%) as shown in the table. (8)

Table (8): Distribution of respondents according to the importance of palm cultivation in agricultural income.

Importance	Number of farmers	percentage
main source	87	72.5
secondary source	27	22.5
An insignificant source	6	5
Average	120	100

We conclude that palm cultivation is a basic and important source of agricultural income on which the vast majority of the respondents depend, which calls for intensifying agricultural extension efforts towards it and intensifying awareness of the injection method of fertilization and control in order to increase the number of palm trees and increase their productivity.

The second aim:

The researcher determined the level of spread of the injection technology of the palm trunk for the purposes of fertilization and control, according to the indicators of the spread of modern technologies, as follows:

First: The number of technology applicants

The results showed that the majority of the (120) respondents apply the technology of injecting the palm trunk, and this indicates the widespread spread of this technology in the district, and this indicates that the technology meets the needs of farmers and contributes to achieving a continuous increase in agricultural productivity and production and improving the quality of dates, in addition to improving farm income and its role in preserving natural and environmental resources.

Second: The area in which the technology is applied

The results showed that the majority of the (115) respondents applied the injection technique to the palm trunk on the whole orchard at a rate of 95.8%. As for the respondents who applied to a part of the orchard, their number was (5) at a rate of 4.2%, as shown in Table (9):-

Table (9): Distribution of the respondents who applied the technology to the entire area of the orchard and to part of the area of the orchard.

Technology application	Farmers numbers	percentage
All	115	95.8
Part	5	4.2
Average	120	100

We conclude from this that the majority of the respondents apply the technology to all orchards because of its availability at reasonable prices and contribute to reducing time and effort as well as being safer than the traditional methods used in fertilization and control.

Third: the sustainability of the application

1- Number of years of application:

The results showed that the category of respondents who had a number of years of technology application ranging between (4-6) years ranked first with a percentage of (47.5), then the category of respondents (7-9) years ranked second with a percentage of (28.3), then the category of respondents (1- 3) A year in the last rank, with a percentage of (24.2), as shown in Table (10).

Table (10): Distribution of respondents according to the number of years of applying the injection technique of the palm trunk.

Number of years of application	Farmers numbers	percentage
1-3 / year	29	24.2
4-6/year	57	47.5
7-9/year	34	28.3
Average	120	100



We conclude that the number of years the respondents applied the injection technology to the trunk of the palm tree was a good period for adopting this technology. of wastage and can be applied in various conditions such as wind and rain.

2- Continuity in the application of technology

The results showed that the majority of the (115) respondents continued to apply the palm stem injection technology with a rate of (95.8%), while the respondents who did not continue to apply the palm trunk injection technology were (5) with a rate of (4.2%) as in Table (11).

Table (11): shows the distribution of the respondents according to the continuous application of the injection technique of the palm trunk.

Continuity of application	Farmers numbers	percentage
continuous	115	95.8
not continuous	5	4.2
Average	120	100

We conclude that the majority of the respondents continue to apply the injection technology because of the positive results achieved in fertilization and control of the contribution of this technology in reducing the rate of environmental pollution because the pesticide is injected in a closed system and the efficiency of the chemicals used for this method increases and its effect is significant against many types of insects that infect palm trees.

Fourth: the future direction of sustainability and application

A- Desire to continue applying injection technology

The results showed that the majority of the respondents (115) wished to continue applying the injection technology in the trunk of the palm tree at a rate of (95.8%), while the respondents who did not continue to apply the palm trunk injection technology were (5) with a rate of (4.2%) as in Table (12).

Table (12): Distribution of respondents according to their desire to continue applying injection technology in Al-Tarmiya district.

Desire for continuity	Farmers numbers	percentage
I want to continue	115	95.8
I do not want	5	4.2
Average	120	100

We conclude the desire of the respondents to have a desire to continue applying the injection technology with the trunk of the palm, because of the efficiency of the injection technology with the trunk of the palm and achieving the desired goals of adopting it, which is a more economical and less polluting method for the environment, and achieving a high rate of killing insects for palm trees treated by the injection method, more than 85% of palm trees treatment by other methods

b- The technology is compatible with the experiences of palm farmers.

The results showed that the majority of the respondents, amounting to (116), that the technology is compatible with their experience, with a rate of (96.6%), while the respondents

whose technology is not appropriate for their experience was (4), with a rate of (3.4%), as shown in Table (13).

Table (13): Distribution of respondents according to the compatibility of technology with their experiences in the district of Al-Tarmiya.

The compatibility of technology with the experiences of farmers	Farmers numbers	Percentage
compatible	116	96.6
non compatible	4	3.4
average	120	100

We conclude that the technology is compatible with the experiences of the respondents because of its ease and can be used in the most difficult conditions and does not cause damage to palm trees.

Adaptation of technology to agricultural systems

The results showed that the majority of the respondents, who numbered (116), were suitable for their farming system, with a percentage of (96.6%), while the respondents whose technology is not appropriate for their experience was (4), with a rate of (3.4%), as shown in Table (14).

Table (14): Distribution of the respondents according to the suitability of the injection technique of the palm trunk with the agricultural system in the Al-Tarmiya district.

suitable Technique	Farmers numbers	percentage
suitability	116	96.6
Non suitable	4	3.4
Average	120	100

We conclude that the technology is suitable for the agricultural systems of the respondents because of its ease and efficiency of application and the possibility of achieving the highest productivity in quantity and quality, and it is used in dense orchards that are densely populated with imaginary trees.

D- View the results of the application

The results showed that the majority of the respondents, whose number is (115), can see the results of the technology at a rate of (95.8%). As for the respondents who do not see the results of the technology, their number was (5) at a rate of (4.2%), as shown in Table (15).

Table (15): shows the distribution of the respondents in observing the results of the application of the injection technology with the palm trunk in the Al-Tarmiya district.

View the results of applying the technology	Farmers numbers	percentage
	115	95.8
I watch	5	4.2
I do not watch	120	100

We conclude that the majority of the respondents can see the results of injection technology in fertilization, control and application time are less compared to other methods, as well as other advantages.



E- Compatible with the prevailing values and customs in the region

The results showed that the majority of the respondents, who numbered (111), that technology is compatible with the prevailing values and customs in the region, with a percentage of (92.5%), while the respondents were not compatible with the prevailing values and customs in the region, so their number was (9), with a rate of (7.5%), as in Table (16)

Table (16): Distribution of respondents according to the compatibility of the injection technique with the trunk of the palm tree with the prevailing values and customs in the Al-Tarmiya district.

Compatible with prevailing values and customs	Farmers numbers	percentage
Compatible	111	92.5
not compatible	9	7.5
Average	120	100

We conclude from this that the majority of the respondents are compatible with technology with the prevailing values and customs in the region because it contributes to preserving productive and fruitful agricultural crops and trees as well as its contribution to reducing production costs, effort and time, protecting the environment and reaching the highest productivity in quantity and quality.

F- Possess sufficient expertise and skills to apply the technology.

The results showed that the majority of the (115) respondents had experience and skills to apply technology at a rate of (95.8%), while the respondents who did not have experience and skills to apply technology were (5) at a rate of (4.2%) as in the following table (16).

Table (16): Distribution of the respondents according to their experience and skills to apply the injection technique with the trunk of the palm tree in Al-Tarmiya district.

Possession of the respondents experiences and skills	Farmers numbers	Percentage
I have	115	95.8
I dont have	5	4.2
Average	120	100

We conclude from this that the majority of the respondents have sufficient skills and experience to apply the injection technique of the palm trunk for ease of application in the two processes used in fertilization and control.

CONCLUSIONS

- 1- The injection technology of the palm trunk has achieved a high level of spread in Al-Tarmiya district in injecting pesticides and fertilizers into the trunks of palm trees, as it is one of the very effective and economical methods when compared to other methods, as well as reducing environmental pollution and ensuring consumer protection.
- 2- The extension activities provided in the field of date palm service are rather few and the focus is on the control aspect at the expense of the rest of the aspects.

RECOMMENDATIONS

- 1- Continuing to spread this injection technology because of its role in preserving humans, animals, the environment, and beneficial insects such as bees in all governorates of the country.
- 2- Increasing extension activities in the field of fertilization and intensifying efforts in the field of control
- 3- Increasing interest in technology and increasing government support for farmers by providing this technology and training farmers on how to use it.
- 4- Educating farmers about the importance of this technology in preserving the environment from pollution

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