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Obstacles to the development of palm tree cultivation and date production in Al-Muthanna Governorate

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Abstract: The cultivation of palm trees is one of the predominant agricultural activities, practiced by the peasants of Al-Muthanna Governorate since ancient times, it has social, environmental and economic importance, contribute to increasing the local production and the national product of the country, it was exposed to geographical obstacles (both natural and human), and other biological (insects and diseased pests), caused challenges and problems, it negatively affected the cultivation of palm trees and its production of dates, both in terms of quantity and quality, that is why these obstacles were studied in the years (2020 and 2021), in order to find appropriate solutions, in line with the stages of growth of the first palm trees to the stages of maturity and marketing, in addition to highlighting the benefits of all its waste, in order to benefit from them in the food, household and heritage industries that have been circulating for thousands of years. The study suggested providing technical and material support to workers in the cultivation of palm trees, providing good quality seedlings, and carry out periodic and continuous campaigns to combat pests and diseases that affect palm trees and their fruits.

Keywords: Obstacles, production of dates, pests, development.

Introduction

The research aims to find solutions to challenges and problems, facing the cultivation of palm trees and improving the quality of dates production in Al-Muthanna Governorate, which was one of the economic, environmental and social problems, which the research dealt with in two sections. The first was the reality of palm tree cultivation, its production and its spatial distribution among the administrative units in the governorate. As for the second topic, it deals with the most important natural, human and biological obstacles, in addition to the introduction and conclusion that included conclusions and suggestions, which revealed the concentration of palm trees in the districts of Samawah and Al-Khidr at rates of (36%, 20.5%), respectively of the total number of palm trees in the study area, while Salman district did not have any numbers of palm trees, this was what the research dealt with by planting palm trees as a first stage in the regions of Al-Rehab and Wadi Kharaz, which belong to the district of Al-Salman.

1. Research problem

The research problem is summarized according to the following question: -What were the obstacles and challenges that hinder the development of palm tree cultivation and date production in Al-Muthanna Governorate?

2. Research Hypothesis:

The research hypothesis can be formulated as follows-:
There were geographical (natural and human) and biological challenges and obstacles that impede the development of palm tree cultivation and date production in the governorate.

3. Research objectives:

The research aims to uncover obstacles to the development of palm tree cultivation and date production, finding appropriate and appropriate solutions, in order to contribute to increasing the number of palm trees and improving their quality, thus, this is reflected in the increase in the production of dates, which improves the economic and environmental condition of the population of the province. The production of dates is growing in the study area and Iraq.

4. Importance of research:

The importance of research highlights in giving a clear picture, to address the problems and obstacles to the development of palm tree cultivation, and the production of dates in a realistic and thoughtful manner, which

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encourages the creation of a suitable and suitable environment for the cultivation of palm trees, improving its types and increasing its production of dates, in addition, those concerned with the development of agricultural production and those interested in, maintaining a healthy, pollution-free environment in the study area, benefiting from the research findings, for the purpose of setting development plans and current and future programs, to develop palm trees cultivation, improving the production of qualitative and quantitative dates as an economic agricultural product, it enters into food industries important to human needs and necessary requirements.

5. Research Methodology:

The researchers followed the regional approach and the cropping approach, to study the obstacles to the development of palm trees and the production of dates, with the help of field study and data and information collection from government institutions specialized in agricultural affairs, in addition, actual observations were documented with photographs, to promote the study of those developmental obstacles in order to find appropriate solutions to them.

6. The boundaries of the research area:

The research area was represented by the administrative borders of the Muthanna Governorate, which has an area of (51740 km^2), to constitute the second largest governorate of Iraq by area, with a percentage of (11.9%) of the total area of Iraq, which is (434,128 km^2). Al-Muthanna Governorate is located astronomically between two latitudes (31° 42′ 31" - 29° 50′) to the north, and between (46° 32′ - 43° 50′) east longitudes, it is bordered to the north by Al-Qadisiyah Governorate and to the northeast by Thi-Qar Governorate, from the west, Najaf Governorate, its southern administrative border is an international border with the Kingdom of Saudi Arabia (Map 1). As for the temporal limits of the research, they were in the two years (2020-2021).

Map (1): The geographical location of Al-Muthanna Governorate.
Source: the researchers, based on: Republic of Iraq, Ministry of Water Resources, General Authority for Survey, Map Production Department, Al-Muthanna Governorate Map at 1:500000 scale, 2007.

The first topic is the reality of palm tree cultivation and dates production in Al-Muthanna Governorate

First: The importance of palm trees:

The cultivation of palm trees in the study area is one of the important agricultural activities, since the human inhabited the governorate areas, lived near the banks of the Euphrates River and its streams and formed scattered rural villages, palm trees were cultivated to obtain the dates they produce, which was important and essential to meet his daily food needs, in addition to the social, economic and environmental importance that the researchers addressed as follows:

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1. Social and Environmental Importance:

The importance of palm trees stands out in several social, economic and environmental fields that the palm achieves, since it appeared in Iraq since ancient times, it has a historical and social character, mixed with the Iraqi spirit and values along civilizations, that prevailed in Mesopotamia, and the importance and sanctity of palm trees increased, when the Holy Qur'an referred to it in the Almighty's saying (And We have made therein gardens of palms and grapes) Surah Yasin (verse 34), as mentioned in the noble Prophet's hadith (honor your aunt the palm tree), which made the palm an important feature that requires its preservation, providing the appropriate geographical environment for its growth and reproduction throughout the ages, the residents of the study area made use of every part of the palm tree to meet their daily needs, which was why they have a variety of crafts and handicrafts and multiple benefits, from their trunks, houses were roofed and crossings and bridges were built on rivers, streams, and streams, from its fronds, mats, handlooms, scraps, cages, beds, chairs, and hats are made as head coverings, in addition to that, palm tree fronds were entered as a basic raw material for the paper industry in Iraq since 1976 in the Basra Paper Factory (1).

As for the palm fiber, it is made of ropes of different sizes, while the palm tree was used in the past periods as firewood for heating, heating and home cooking, which makes all parts of palm trees of economic importance and basic requirements that cannot be dispensed with in many local industries that can be developed and introduced into the industry Compressed wood, as fodder and concentrated rations for poultry and animals, as well as local household furniture, which is considered one of the inherited folklore and other products. The reason for the neglect in exploiting the potentials of palm trees is due to the lack of centers for collecting the waste produced by date palm for the purpose of facilitating its manufacture, as well as the lack of studies that contribute to the development of the cultivation of palm tree species. Palm trees and their development in the study area. As for the environmental aspects of the palm orchards, they constitute a beautiful landscape and a beautiful and bright nature because palm trees are evergreen throughout the seasons of the year and are the lungs of the governorate's regions and cities and the main outlet for the population, as trees limit the extremes of the dry desert climate and the quantities of dust and dust Palm trees are also a symbol of the desert environment due to its adaptability and endurance to high temperatures, salinity and water Because of the drought that generates the problem of desertification that most of the lands of the study area suffer from, in addition, the orchard lands are a suitable environment for planting various citrus trees to protect them from the summer heat and the cold winter. Examples of these trees are apples, pomegranates, grapes, figs, apricots and other fruit trees. It is located on the banks of rivers and streams such as the eastern and western palm groves and the orchards surrounding the city of Samawah (Picture 1) and the orchards overlooking the banks of the Euphrates River in the district of Al-Khader and the orchards surrounding the cities of Rumaitha, Warka and Al Majd. In addition, the date palm groves' environment contributed to preserving the wild biodiversity of local and migratory birds, as it took them as a safe haven from harsh climatic conditions and a suitable environment for their reproduction and nesting.

Picture (1): Trees planted among palm trees in Al-Sayagh orchards in Samawa.

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2. The importance of producing nutritional and economic dates:

Dates are one of the most important plant nutrients important to the human body and its growth, because it contains an integrated food material and is an important source of energy for the human body, it contains a group of vitamins such as (B1, B2, A, C) and organic materials such as proteins, sugars and cellulose materials (2), in addition, each (100 g) of dates contains large values of mineral salts that are necessary and beneficial to human health and activity (Table 1), the salts were arranged from lowest to highest ratio, as for the economic importance of palm trees and the production of dates, it stands out through the entry of dates of various types into international trade, increasing domestic and global demand for consumption, which requires modern manufacturing processes to ensure the quality of local dates, and improving the image of the Iraqi producer of dates, it encourages its production in the study area, consequently, Iraq's exports of agricultural products increased, which contribute to increasing national income and bringing in hard currency in 2021, Iraq's exports of dates reached (600 thousand) tons to Arab and foreign countries (3), in addition, there are (113,360) farmers, table (6) of the population.

Table (1): The mineral salts present in dates per 100 g.

Element	Value (g)
Copper	0.18-0.21
Iron	1.30-2.0
Sodium	4.10-4.80
Sulfur	43.80-51.00
Magnesium	50.30-58.50
Phosphorous	54.80-63.80
Calcium	58.30-67.80
Chlorine	268.00-290.00
Potassium	654.00-649.00

Source: Abdul Rahman Brindi, Palms and the nutritional and medicinal benefits of dates, 1st Edition, Raslan Foundation for Printing, Publishing and Distribution, 2007, p. 81.

The study area works in the cultivation of palm trees and seedlings, transporting and planting them, preparing the appropriate soil for them, and in the season of harvesting dates through the process of packaging, manufacturing, transporting and selling them in the local markets, which means that there are important economic benefits that generate for the owners of palm orchards to improve their living situation. In addition, types of inferior dates that are not suitable for human consumption, chickpeas, seeds and fronds are used in the process of producing cheap and useful animal feed for animals raised by most farmers and livestock owners in the study area.

Second: The reality of palm tree cultivation in Al-Muthanna Governorate

Palm trees rank first among other plant trees planted in the study area in terms of their spread, height, economic resources, environmental benefits and numbers. The total number of female palms reached (1218643) palm trees, while the number of male palm trees amounted to (267436) palm trees, bringing the total number of palms in the study area (1248978) palm trees in the year 2020 constitute (7%) of the total number of date palms (females and males) in Iraq amounting to (17348741) palm trees in the same year (4). So that the study area occupies the tenth rank of the sequence of the thirteen Iraqi governorates (*) which are famous for palm cultivation, which means that there are development obstacles that have contributed to the low percentage of palm numbers in the study area, which occupies the second place in area among the other governorates of Iraq, and it is possible to increase the number of trees Palm trees and their development and improvement if good planning is done. As for the most famous names of palm trees planted in the study area, they were divided into six main varieties according to their numbers, from the most numerous, which is the Zuhdi class. There are palm trees of various other varieties that constitute (29%) of the total number of palms actually produced in the study area, such as Al-Maktoum, Al-Balka, Al-Dakl, Al-Barhi, Al-Shukr and others. The total number is (622047) palm trees (Table 2).

Third: The reality of date production in Al-Muthanna Governorate

The fluctuation of date production and quality in the study area from one season to another is the dominant characteristic of all types of dates as a result of the influences of the geographical environment through which the produced palm trees and the stages of palm fruit growth until they reach the stage of maturity and

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harvest. In the year 2020, the total production of dates for different varieties in the study area reached (38245) tons, or (5.2%) of the total production of Iraq, which amounted to (735353) tons. Dates, while its percentage reached (4.8%) of the total production of Iraq of the Al-Zahdi variety, while the least productive date variety was the Al-Halawi variety, reaching (1547) tons, to constitute the lowest percentage of the production of dates in the study area, which reached (4%) Table (2) While the other date varieties (Al-Diri, Al-Khadrawi, Al-Khastawi, Al-Sayer, other types) occupied percentages (12.8, 9.1, 6.9, 5.3, 30.4), respectively, of the production of the study area and when comparing the average productivity of the palm in the production stage for the year 2020 according to the date types) Al-Zahdi, Al-Diri, Al-Khadrawi, Al-Sayer, Al-Halawi, and other types) which It reached (63.5, 57.1, 60, 60, 57.5, 56, 59.2) kg, respectively, in Table (2).

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Table (2): The total numbers of palm trees and the average productivity of the date palm in the production stage by varieties in Muthanna Governorate and Iraq for the year 2020.

No.	Cultivar	Palms total numbers	not reached the production stage	Trees planted in 2019	Palm numbers in the production stage			Average palm yield (kg/palm)		Date production per ton			
					unproductive	productive	Total	unproductive	productive	Al-Muthanna governorate production	The ratio (%)*	Iraq's production	The ratio (%)**
1	Al-Zahdi	273656	59767	24353	16719	172817	189536	69.7	63.5	12040	315.	396686	4.8
2	Al-Diri	91358	1207	4499	1713	83939	85652	58.3	57.1	4894	128.	30004	16.3
3	Al-Khadrawi	74953	7573	9484	3474	54422	57896	63.8	60	3472	9.1	36404	9.5
4	Al-khastawi	69275	6035	19231	0	44009	44009	60	60	2641	6.9	82375	3.2
5	Al-Sayer	46148	3987	6987	0	35174	35174	57.5	57.5	2023	5.3	28592	7.1
6	Al-Halawi	41206	3667	9914	0	27625	27625	56.00	56.00	1547	4	19652	7.87
7	Other types	622047	185200	240373	21612	174862	196474	66.5	59.2	11628	304.	141640	8.2
Total		1218643	267436	314841	43518	592848	636366	64.5	60.1	38245	100	735353	5.2

The two researchers based on: - Republic of Iraq, Ministry of Planning, Central Statistical Organization, Directorate of Agricultural Statistics, Dates Production Report, 2020, p. 22.

* Divide the production of each item in the province by the total production of the province x 100.

** Divide the production of each variety to maintain the production of each variety of dates production in Iraq x 100.

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The average productivity of the palm tree in the production stage in the province of Qadisiyah, adjacent to the study area for the same year, according to the date types (Zuhdi, Al-Diri, Al-Khadrawi, Al-Khastawi, Al-Sayer, Al-Halawi, and other species) we find it to reach (100.3, 50, 77.7, 81.5, 60, 80.9, 58) kg, respectively (5), which exceeds the production of its counterparts in most palm varieties in the study area, which requires addressing the developmental obstacles that led to A decrease in the average productivity of the palm tree in a way that enhances production and improves its quality.

Fourth: Spatial distribution of palm trees in Al-Muthanna Governorate

The spatial distribution of palm trees and the area they occupy varies among the eleven administrative units in the study area, as palm trees were concentrated on an area of less than (10%) of the area of the governorate, reflecting the role of natural and human factors prevailing in each administrative unit, as the Samawa district included the largest number Of the palm trees among the administrative units in the study area amounted to (351,754) palm trees, while Al-Salman district did not record any numbers for planting palm trees despite the fact that it constitutes an area of land amounting to (18708000) dunams, or (90.4%) of the governorate's area (20696000) acres. (9.6%) of the study area, in which the number of trees was arranged according to administrative units from the most numerous, which is the Samawah district, to the Salman district, which did not record any number of palm trees, (Table 3).

Table (3): Administrative units and their area, number of palm trees, number of orchards and area, and number of farmers in Al-Muthanna Governorate for the year 2020.

No.	Administrative units	Area (dunm)	The ratio (%)	Total number of palm trees	The ratio (%)	Numbers of orchards	orchards area (dunm)
1	**Samawa**	313668	1.5	351754	36	2400	8700
2	**Khidr**	542800	2.6	200000	20.5	710	5000
3	**Al-Suwayr**	125932	0.6	116000	11.9	600	3000
4	**Warka'a**	391200	1.9	94420	9.7	1418	4000
5	**Al-Majed**	58000	0.3	80000	8.2	381	2000
6	**Darraji**	124000	0.6	40623	4.2	208	1042
7	**Rumaitha**	42400	0.2	40144	4.1	209	2500
8	**Najmi**	261600	1.3	38692	3.9	245	1129
9	**Al-Hilal**	128400	0.6	14545	1.5	310	1600
10	**Al-Salman**	18708000	90.4	0	0	0	0
Total		20696000	100	976178	100	6481	28971

Source: The researchers based on: Republic of Iraq, Muthanna Governorate, Muthanna Agriculture Directorate, Agricultural Statistics Division, unpublished data, 2021.

* The lands of Busayyah district were added to the lands of Al-Salman district, because there is no agricultural division in Busayyah district.

Therefore, the researchers sought to classify the date palm numbers data in the study area and distribute it into three categories and according to their percentage, map (2), as follows:

The first category: (8% or less) and this category is considered the lowest among the categories in terms of palm numbers and the highest in terms of the number of administrative units that were included, namely (Al-Daraji, Al-Rumaitha, Al-Najmi, Al-Hilal, Al-Salman). The number of palm trees reached (40623, 40144, 38692, 14545, zero) palm trees, respectively, with a percentage of (4.2%, 4.1%, 3.9%, 1.5%, zero%) respectively of the total palm trees in the study area. The orchards area of this category occupied a total of (6271) dunums, distributed on 972 orchards, while the administrative units in this category occupied a total area of land (19264400) dunams, constituting (93%) of the area of Al-Muthanna Governorate, which means that most of the lands of the study area are free of palm groves and have become subject to desertification and drought and the center to provoke sand and dust storms that affect the local environment and human health in particular.

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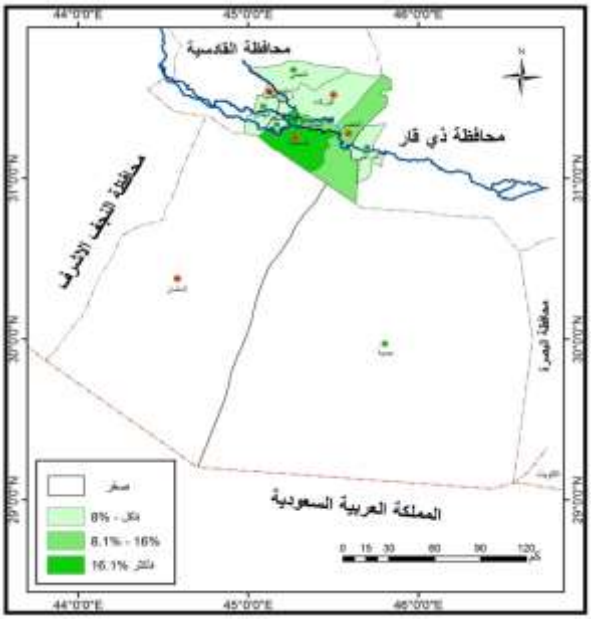
The second category: (from 8.1% - 16%) This category is represented by three administrative units (Al-Suwer, Al-Warka, Al-Majd). %, 9.7%, 8.2%), respectively, occupied the area of the orchards in which a total of (9000) dunums were due to the spread of palm trees in this category to the extension of the glory lands on both sides of the banks of the Euphrates River north of the city of Samawa, while the lands of southern and western Suwayr extend on the banks of the Euphrates River East of the city of Samawa, while the agricultural lands in Warka suffer from a lack of surface water after the drought of the Shatt al-Warka, which was dependent on Shatt al-Rumaitha, and now agriculture depends on the waters of streams that are fed from the Euphrates River by pumps.



Map (2): Relative distribution of palm trees according to the administrative units of Al-Muthanna Governorate.
Source: the researchers based on the data in Table (3).

The third category: (16.1% or more) This category recorded the largest number of date palms in the study area and includes (Samawa, Al-Khidr) with (351,754, 200,000) palm trees respectively, and (36%, 20.5%) respectively of the total number of palm trees in the governorate were occupied The area of the orchards in them is (8700, 5000) dunams, respectively. The reason for the concentration of palm orchards in this category is due to the passage of the Euphrates River in the middle of the lands of the Samawah district and the middle of the lands of the Khidr district, which made their lands located on the two banks of the river as well as the attention, care and experience of the farmers in the palm groves and the renewal of their cultivation .

The second topic: - Obstacles and challenges facing the development of palm cultivation and date production in Al-Muthanna Governorate

Obstacles and challenges that affect the development of palm cultivation and date production in the study area varied due to the overlap and change in natural and human obstacles, as well as diseases and pests that affect palm trees and production of dates directly and indirectly. The most important of these obstacles and challenges are the following:

First: Natural Obstacles and Challenges

Natural factors still have a direct and significant impact on palm cultivation and on the production of dates, both in quality and quantity, despite the technical and technological developments reached by man in the field of various sciences. The most important of these factors are the following:

1. Climate elements: The climate, with its various phenomena and elements, is at the forefront of the natural factors affecting agricultural processes, production and marketing (6), as these phenomena and elements are among the obstacles to natural development in the study area, and the most important of these elements are the following:

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A. Temperature: Temperature was one of the most important climatic factors that have a direct impact on the cultivation of palm trees and the growth and development of their fruits. Rather, it determines the success or failure of palm cultivation in various regions of the world (7). For this reason, we find that cold areas are not suitable for palm cultivation and date production, and it is possible for palm to grow in them, but it loses its ability to flower, which is the first and basic stage for the production of dates. While the palm blooms, grows and produces in warm and hot regions, as is the case in central and southern Iraq. This is proven by the results of many researches that the emergence, growth and cracking of pollen in female palm trees or stallion palm trees is at the optimum temperature for pollen germination ranging between (15-22) °C, but if the temperature levels rise more than (38) °C ° In the pollination season, this generates negative effects on production, because the high temperature leads to a decrease in the rate of fruit set as a result of the loss of viscosity in the stigmas of flowers (8). The first, January and February) reach (12.97) ° C, while the average temperature in the spring months (March, April, May) reaches (24.8) ° C, while the average temperature in the hot summer months (June, July, August) to (36) ° C, as for the average of the autumn months (September, October, November) it reached (26) ° C, palm trees begin to grow vegetatively (frond growth) at a temperature of (9.4) ° C. ° and flowering at (18) ° C (9). The higher the temperature in the winter months, especially January, the earlier the flowering. The average temperatures for early-ripening, medium-ripening and late-ripening palm cultivars are (21.1) °C, (23.9) °C, and (27.7) °C, respectively (10).
When comparing the temperature rates for the four seasons of the year, winter, spring, summer, and autumn, which amounted to (12.97, 24.8, 36, 26) ° C, respectively, in Table (4) with the average temperatures of early-ripening, medium-ripening and late-ripening palm cultivars, as mentioned in the above, we find it appropriate. The average temperature in the seasons of the year in the study area, except for the average temperature in the winter months, is not suitable for flowering and maturity, despite the fact that the fruitful palm trees have the ability to withstand a temperature of (-7) °C as a minimum. If it falls below that, it will not be possible to plant it, as this leads to a halt in the growth process, the death of the newly planted shoots, and the weakness of the fruitful palm in general. As for the upper limits of the temperature, palm trees can withstand (50) °C, as the palm cannot withstand more heat than that except for a short period of time. , as this leads to the weakness of the fruitful palm and its low production and generates an imbalance in the water balance of the palm physiologically (11). Despite that, the researchers believe that the location of the study area in the desert climate region made the daily temperature range large, for example, the temperature in the summer months during the day reaches (48) C. ° or more, and decreases at night to (34) °C, which negatively affects the palm fruits, whose density differs from the density of the fleshy part. This leads to the difference in the expansion and contraction of these two tissues and thus leads to the phenomenon of peeling off the peel from the fruit (12), which negatively affects the maturity and quality of dates and thus affects the prices and marketing of dates. In addition, the anomaly of temperatures in the winter days at night to below zero degrees Celsius, and the crossing of summer temperatures to above (50 degrees) negatively affects the palm productivity and requirements for its development and increased production. Palm varieties vary in their degree of tolerance to the temperatures, which were arranged in ascending order (Al-Halawi, Brim, Maktoum, Khadrawi, Kuntar, Deri, Barhi, Sayer, Khastawi, Ashrsi, Zuhdi) (13), which is an indication of the selection of palm varieties that withstand high temperatures. for cultivation in the study area.

Table (4): Monthly and annual averages of temperature, relative humidity, rain, wind speed, frequency of storms and rising dust at Samawa station for the period (2010-2021).

Season	Month	Average temperature	Average relative humidity (%)	Rainfall (mm)	Average wind speed (m/s)	Frequency of dust and dust storms
Winter	**January**	11.6	67.5	21.5	3	2.3
	February	14.3	57	14.3	3.4	4.8
Spring	**March**	18.5	47	13.1	3.6	7.4
	April	24.9	36	12.6	3.5	9.2
	May	31.1	29	5.5	3.8	8.4

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Summer	**June**	34.9	24	0	4.2	10.4
	July	36.8	22	0	3.9	11.2
	August	36.4	23.3	0	3.6	8.5
Autumn	**September**	32.3	27	0.1	3	4.3
	October	26.9	34	3.5	2.8	3.4
	November	18.8	53	14	2.5	3.1
	December	13	65	15.7	2.9	1.8
Average		24.97	40.4	100.3	3.35	6.2

Source: The researchers based on: - Republic of Iraq, Ministry of Transport and Communications, General Authority for Meteorology and Seismic Monitoring, Climate Department, unpublished data, 2022.

B. Wind speed: The blowing of fast and dry winds during the palm pollen season in the study area leads to the drying and falling of the stigmas of female flowers and pushing the pollen away from them, which reduces the chances of pollen germination in the stigma of flowers, and therefore the percentage of fruit set decreases and the overall production is affected because of this factor (14). In the study area, the average annual wind speed was (3.35 m/s), while its average for the months of March and April reached (3.6, 3.5) m/s, respectively, table (4), which is the pollination season for palm pollen, which requires farmers and owners of palm orchards to carry out the pollination process When the wind speed is slow and calm so that the pollen does not fly and gives it an opportunity to remain in the female pollen as long as possible.

As for the summer season, in which the dry poisonous winds blow in the study area, they cause damage to the quality of dates due to the evaporation of water stored in the fruits, causing their dryness. In addition, the intensity of the winds causes the dates to fall from the palm trees and break the taste holders because they have become more weight and size, especially in The months of August and September, when the average wind speed in them reached (3.6, 3) m/sec, respectively, which is the half-and-full ripening season of dates, as the high-speed winds leave black spots on the dates due to hitting the fronds. The fruits are polluted with dust and create a suitable environment for the appearance of the dust spider that has a dangerous effect on the palm and its production of dates, especially when the dates are ripe in the months of September and October, in which the frequency of dust and dust storms reached (4.3, 3.4), respectively, Table (4), which means there Negative effects on the production and quality of dates and reduces the quantities of dates sold in the local markets or the quantities exported outside Iraq.

C. Relative humidity: The amount of relative humidity, whether it is high or low, affects the palm fruits in the various stages of their growth and formation in a negative way. Among these effects are the following:

Increasing the humidity in the air leads to the infestation of palm pollen, both female and male, with palm pollen fissures. It is noted that the relative humidity in the study area for the months of March and April, the pollination season of palm pollen, amounted to (47, 36)%, respectively, while the annual rate of humidity reached (40.4%) (Table 4) as palm pollen was infected in the orchards of Al-Hilal, Al-Majd, Samawah, Al-Khidr and Al-Daraji, which are located on the banks of the Euphrates River, at a distance of 50 meters more than the palm trees far from the river (15). The reason for this is that palm trees planted near the river are exposed to moisture more than other trees. In general, the rate of relative humidity rises in the winter months to reach its rate (63.5%) and evaporation decreases, while in the summer months, the opposite occurs, where humidity rates decrease It reaches (23.1%) and evaporation increases, which leads to a variance in the quantities of water needs of palm trees, and then the water processing process is less than what the palm loses. Here, an imbalance occurs in the water balance process of the palm, so the percentage of water in the palm trees decreases (16), which exposes it to damages that affect In its growth and the quality of its productivity, and the damages increase in severity when the process of watering the orchards is delayed in the hot summer season of harvesting palm fruits. Because of the high relative humidity, dates are exposed to diseases, including black tail and fruit tails, and production losses increase more when the fruits are in the wet and dates stages (half-ripening and full-ripening). Which affects its moisture content, which leads to the drying of the fruits and consequently the quality and quality of dates decrease, as this leads to an economic loss to the production of dates in the study area and Iraq, which affects the process of developing palm trees and causes material and moral damage to workers in the agricultural sector in general.

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D. Rainfall: Rainfall directly affects the stage of pollination, fertilization, ripening and harvesting of fruits. In the first, rain fall works to wash and moisten pollen grains and download them from the stigmas of female flowers, which means a failure in the process of pollination of flowers, especially if the fall occurred after (6) Hours after the vaccination process, it must be repeated (17). This occurs mostly in the study area in the months of March and April, in which the average rainfall amounted to (13.1, 12.6) mm, respectively, table (4). In this case, the financial cost increases through the additional wages paid to workers in this field, as well as the efforts made by orchard owners to bring in new and additional vaccines from palm stallions to fill the failure that occurred in the pollination process. Rainfall during the ripening and harvesting season has great damage to various types of dates, especially the soft ones. As it leads to its corruption and the fruits gaining the taste of fermentation and rotting, which leads to an increase in the percentage of crop losses and a decrease in its economic value in the study area in which the season of ripening and harvesting of palm fruits occurs in the months (September, October), as the rainfall rate in both of them reached (0.1, 3.5) mm, respectively, although they are small percentages, but they leave damage to the production of dates, and the damage is more severe when the rains are early and the percentage of their precipitation increases, especially in these two months, and this is what happens in some rainy years in the study area from time to time.

2- Soil: Soil is one of the most important obstacles to the development of agricultural activity in general and the cultivation of palm trees in particular. When it is cultivated in light clay soil with a clay content ranging between (25-45%) and total salinity (1500-6000) parts per million and containing calcium carbonate from (15-20)% and the depth of the ground water is more than (3) meters The drainage condition is good (18) and this soil is represented in the lands overlooking the Euphrates River and its streams and branches in the study area, which is one of the best types of agricultural soil in it, as it is characterized by its fertility and porosity, which allows air and roots to penetrate it, and the low level of groundwater and the percentage of salinity in it, which made most palm trees concentrated In those lands that are part of the arable lands in the study area, which amounted to (6323,420) dunams, constituting (30.6) percent of the total lands of the governorate amounting to (20,696000) dunums, while the non-arable lands constituted (69.4) percent, and this pointer to The soil of the study area is one of the obstacles to the development of palm trees and the expansion of its orchards and its spread on the lands of the administrative units in the governorate, which requires modern plans and studies to reclaim it and exploit it agriculturally. The arable land in the study area reached (90.4, 79.1, 95.4) %, respectively. While Al-Rumaitha district occupied the least administrative units in proportion to the total area and the lowest percentage of arable lands and the lowest percentage of non-arable lands in the study area amounted to (0.2, 0.4, 0.1)%, respectively, table (6) in which the administrative units were arranged according to the total area from The most space to the least space. Through the foregoing, the role of arable soils in the process of feeding trees and the growth of their roots, which contributes to the stabilization of palm trees and their resistance to the strong winds that blow in different seasons of the year in the study area, is highlighted.

Table (6): The total area and the area of agricultural lands suitable for agriculture and the area of non-arable lands and their percentages according to the administrative units of Al-Muthanna Governorate for the year 2021.

No.	Administrative unit	Total area (dunams)	%	Cultivable area (dunams)	%	Invalid area (dunams)	%	numbers of farmers
1	**Al-Salman**	18708000	90.4	5000000	79.1	13708000	95.4	520
2	**Al-Khidr**	542800	2.6	417800	6.6	125000	0.9	5420
3	**Al-Warka**	391200	1.9	339581	5.4	51619	0.4	367
4	**Samawa**	313668	1.5	176475	2.8	137193	1	1100
5	**Al-Najmi**	261600	1.3	190637	3	168950	0.86	596
6	**Al-Hilal**	128400	0.6	36848	0.6	91552	0.6	400
7	**Al-Suwayr**	125932	0.6	38000	0.6	87932	0.6	1530
8	**Al-Darraji**	124000	0.6	60000	0.9	64000	0.4	1100

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9	**Al-Majed**	58000	0.3	36751	0.6	21249	0.1	230
10	**Al-Rumaitha**	42400	0.2	27328	0.4	15072	0.1	520
Total		20696000	100	6323420	100	14372580	100	11360

Source: the researchers based on: - Republic of Iraq, Ministry of Agriculture, Samawa Agriculture Directorate, Statistics Division, unpublished data, 2021.

Second: - Challenges and human obstacles

Palm cultivation and date production in the study area are affected by a number of challenges and obstacles, the most important of which were:

1. Technical obstacles to the development of palm trees cultivation

A. There is no comprehensive and accurate census of date palm varieties, stallions, female seed palm varieties, or strains with little spread in the study area, and therefore there is no database on which any productive, marketing or economic agricultural policy can be based in the future that serves the process of developing palm trees and increasing their varieties and production in study area.

B. High agricultural density: Most of the palm plantations spread on the banks of the Euphrates River and its streams in the study area are characterized by dense or irregular cultivations in dimensions and distances, and they are a heterogeneous mixture of varieties. Which leaves negative impacts and reflections on the economic viability of the owners of the orchards. In addition, the excessive density constitutes the biggest obstacle to the development and development of agricultural operations and their mechanization that takes place within the orchard lands. Some of the palm tree service operations are carried out manually due to the difficulty of using mechanization due to crowding of trees or the high price of agricultural equipment and machinery used in servicing palm orchards.

C. Lack of cuttings for palm trees and their high prices: The lack of availability of palm cuttings of high quality and good specifications that suit the environment of the study area helped in the high price of cuttings in a way that most palm farmers cannot buy new seedlings annually and replace old and dead trees. Therefore, it has become one of the main obstacles that hinder the expansion of cultivation and propagation of the desired date palm varieties in the absence of clear development plans or strategy for the dissemination of good varieties of palm that have distinctive characteristics and achieve success in the production of dates in quantity and quality.

D. Lack of manpower and lack of training: The migration that took place in recent years from villages and rural areas to urban centers in the study area to work in industrial, commercial and service activities is one of the factors that contributed to the decrease in the number of manpower working in agriculture in general and palm cultivation in particular, as well as The lack of experience and the lack of training of manpower contributed to the weakness and reluctance of the operations of cleaning, pollinating, harvesting and marketing palm trees, which increased the obstacles to the development of palm orchards, their development and expansion, and the decrease in palm productivity in the study area.

E. High prices of pesticides: The high prices of pesticides and agricultural pests contributed to the lack of knowledge of workers in palm orchards in the study area with the manifestations of infection and the adoption of integrated control programs to protect trees on their own, which are among the basic necessities of orchard owners in a way that makes them able to know palm diseases and pests and ways to use appropriate control means By virtue of their inherited experiences, especially at the present time, after the absence of spraying pesticides on palm trees during the fruit growing season by helicopters of the Iraqi Ministry of Agriculture, which was followed before 2003, in addition, there is no application of agricultural quarantine systems that prohibit the transfer of infected offshoots from the affected area to another Which helped to settle and spread many diseases and pests that have become an obstacle to increasing the production of dates and improving their quality.

2. Procedural and organizational obstacles

A. Lack of manufacturing industries for dates: The absence of the study area from manufacturing industries for dates and from major centers for marketing and purchasing them is one of the development obstacles that do not encourage orchard owners to pay more attention to planting and preserving palm trees and benefit from the surplus production of good and bad dates despite the multiplicity of products that can be

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manufactured such as (vinegar, molasses, liquid sugar, date sweets and others), which requires linking agricultural production of dates with the development of local industries and transformational industries in order to ensure the disposal and continuity of date production by following modern manufacturing processes. In addition, there are no NGOs or companies that provide services to workers in the field. Manufacture of palm by-products into products that are easy to market locally and regionally and benefit from economically. There is no marketing guidance or sufficient marketing information to help producers who own the study area's orchards in marketing and selling their dates crop.

B. Urban sprawl and expansion: The urban sprawl and the expansion of random residential facilities and buildings on orchard lands in the study area are among the development obstacles that have increased in recent years and have contributed greatly to the excessive cutting of palm trees and the change in their land uses Picture (2), especially the lands of orchards adjacent to the centers of the city of Samawah And the city of Al-Rumaitha and the city of Al-Khader, whose orchard lands were transformed after 2003 AD into residential plots (random construction), which helped reduce the areas of orchards and green spaces, which are the breathing space of cities and the safety of their environment from pollution. Which is located on the Muthanna desert side, which is a source of the effects of these air pollutants, whose activity and damage to the environment of cities and the production of dates, especially in dry years devoid of rain, increase.

C. Poor agricultural planning: Poor agricultural planning is one of the obstacles to the development of date production in the study area from the beginning of palm cultivation, which requires the provision of agricultural equipment and machinery and facilitating the irrigation process through the control of pests and insects that have negatively affected the cultivation and production of date palms to its final stages, which is the harvest of the crop that It requires the presence of safe stores that meet the needs of the study area to store dry dates and semi-dry dates to protect them from insect infestations until they are marketed or manufactured. When researchers field study for marketing dates, it was noted that primitive methods were used in classifying and selling dates on the sidewalks of streets and public roads (Picture 3), which requires the provision of Cold stores in the production areas to store dates to avoid rapid spoilage and fermentation. At the same time, cold stores maintain their quality until they are marketed even in the off-season, in order to achieve economic imports that encourage workers in the study area's orchards to expand palm cultivation and improve production

Picture (2): The excessive cutting of palm trees in the western palm groves in the city of Samawa.

Source: field study on 11/15/2021

Picture (3): Selling dates in the streets and public roads in the eastern orchards in the city of Samawa.

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Source: field study on 11/15/2021

D. Agricultural Policy: A successful agricultural policy aims to encourage and develop agricultural production through a set of planned legislation and procedures that contribute to achieving and overcoming the obstacles, challenges and problems facing the agricultural sector, given the wars and economic and political fluctuations that Iraq has experienced during the past years, which made the agricultural policy In Iraq, it is going through multiple and fluctuating stages that negatively affected the achievement of its desired goals, including the lack of agricultural credit, which helps to increase production and secure the requirements of farmers in various agricultural production processes, in addition to the lack of educational and training courses for palm orchard farmers on a regular and practical basis according to time stages commensurate with the growth of palm trees Reap its fruits by providing them with new ideas and methods that help them develop their orchards, especially the new farmers, and to guide them using modern agricultural methods, including ways to irrigate orchards, which are today one of the most important real problems that limit the expansion of orchard lands and the perpetuation of their trees due to water scarcity and high salinity, a problem that Iraq and the study area suffer from. Because of climatic changes, river levels have decreased Tigris and Euphrates.

C. Weak agricultural extension: The weakness of the services and activities provided by the agricultural extension and its failure to keep pace with modern agricultural and technological studies and research contributed greatly to the low production and development of dates and the cultivation of palm trees in the study area, which reached the number of agricultural extension agents in all its administrative units (45 extension agents). agriculturally) in the year 2020 (19). As their activities became related to attending local seminars and survey tours during the stages of agricultural operations, which are routine practices devoid of renewal and scientific research. In addition, there are no typical palm orchards in the study area that can be adopted as a model for palm farms in the governorate. There are also no instructions regulating the process of planting palm trees and developing dates production through careful monitoring and follow-up that promote and guide farmers on the use of agricultural pesticides to control pests, the type of pesticides, methods and stages of use that most orchard owners are ignorant of. Agricultural activities due to the discrepancy and low wages paid to them and the presence of administrative, planning and legal problems and challenges that contributed to reducing the area of agricultural land in the study area.

Third: Life Challenges and Obstacles:

Agricultural diseases and pests directly hinder the process of improving the production and development of dates and contribute to the decline in the number of palm trees. Among these diseases and pests that were monitored in the study area are the following:

1. Fruits wilt: When palm fruits are infected with this disease, they are exposed to wilting, wrinkling and shrinkage of the surface of the fruit, then dryness and turn into fouling that is only suitable as animal feed. Picture (4) This phenomenon occurs in certain types of dates in the study area and not others during the stages of tigers of fruits from Jamri There are two types of palm wilt, the first type is due to infection with

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stalk borers, and the second type is due to insects that contributed to infecting some of the thorns or the entire stalk, according to the damage caused by insects, and one of the most important factors that led to its spread in the study area is the lack of The regularity of irrigation in terms of the amount of water and the time of irrigation, and the palm's failure to obtain the right amount of water during the ripening period of the fruits, as well as the abundance of pregnancy and the large size of the taste, which leads to its breaking and thus withering, which leaves damage to the quantities of dates production in the study area up to (9%).) of the total production (20).

2. Black tail: Symptoms of infection with this disease appear in the study area at the end of the green stage (Al-Jamri) and the beginning of the colored stage (Al-Khalal) and it causes blackening of the tail or tip of the fruit. The increase in irrigation water in the summer is one of the reasons for its occurrence, as the infection exposes it to cracks in the skin of the fruit, in particular In the area near the funnel, there are transverse cracks, followed by drying and death of the subcutaneous layer of the cracked epidermis and darkening of its color. Picture (5). Which changes its taste and shape and makes it of lower quality and is not suitable for marketing or sale and thus hinders the development of dates production in the study area, whose infection rate reaches (4%) of the total production of palm fruits (21).

3. Finishing (tattooing): Tattoo disease affects sensitive and rare fruits in the study area, such as: Deglet Nour and Al-Halawi, and makes them unfit for human consumption. Its main symptoms are the swelling and swelling of cells under the cortex, which causes cracks in the form of longitudinal or horizontal thin lines of brown color that leads to the death of the surrounding cells Cracks also lead to hardening of the crust, dryness of the fleshy layer, and a decrease in the quality of the fruits image (6), and one of the main causes in the study area is high humidity during the transformation of fruits from the stage of jamri to the stage of Khalal, crowding of the fronds and thick shade on the fruits, and the infection rate in the study area reaches (2%) out of the total fruit production (22).

4. Inflorescnce rot disease: This disease affects the flowering inflorescences of the pollen of male and female palm trees (Picture (7). It is considered one of the most dangerous fungal diseases that affect palms (23). One of the symptoms of the pollen infection is the appearance of brown spots on the covers of the pollen, and they develop to spread the fungus in the form of white powder on the flowers and the flower spikes. The spores of this disease also spread in the head of the infected male or female palm and then from one palm to another by wind, insects and humans. The infection is renewed on the palm annually because the fungus remains between the anguish and the affected palm trees. Rain, high humidity and low temperatures encourage the occurrence and spread of the disease, which affects the Palm fruits from the early stages of growth and flowering.

5. Dust spider: The dust spider is one of the most influential and dangerous agricultural pests on the production of dates in the study area, as the nymphs, larvae and the full stage suck the plant juice from the fruits and the infection starts first from the end of the funnel and then continues to the other end of the fruits, which makes the fruits incomplete Its maturity and growth, and its color changes to reddish-brown, and many cracks appear on it, and this can be observed with the naked eye by covering the affected stalk with a spidery tissue that secretes the mite that helps to stick the dust particles and dates appear dusty (Picture 8). Including, in addition to the lack of irrigation water and neglect of orchards service, which causes a great loss in the production of dates in the study area.

6. Dubbas: Dubbas affects the quality of the dates produced in the study area by sucking the juice of palm fronds and stalks (Picture 9). The infestation is more severe on the neighboring palms from the Euphrates River and its streams, as well as on trees close to seedlings. This insect appears in the summer months (July, August and September), which is the time when the date palm fruits are about to partially ripen. This makes the production of dates face real problems, as there was no regular control on all orchards in which Dubas infestations appear, where the percentage of date palm infestation reaches (10%) of the total fruitful palm trees in the study area (24).

7. The date lesser moth insect: It is also called (the small date worm), which is one of the pests that infect various types of dates in the study area in the first months of their growth (April, May, June), causing great damage to the taste, which is the storehouse of fruits and their growth by feeding the larvae on most of the

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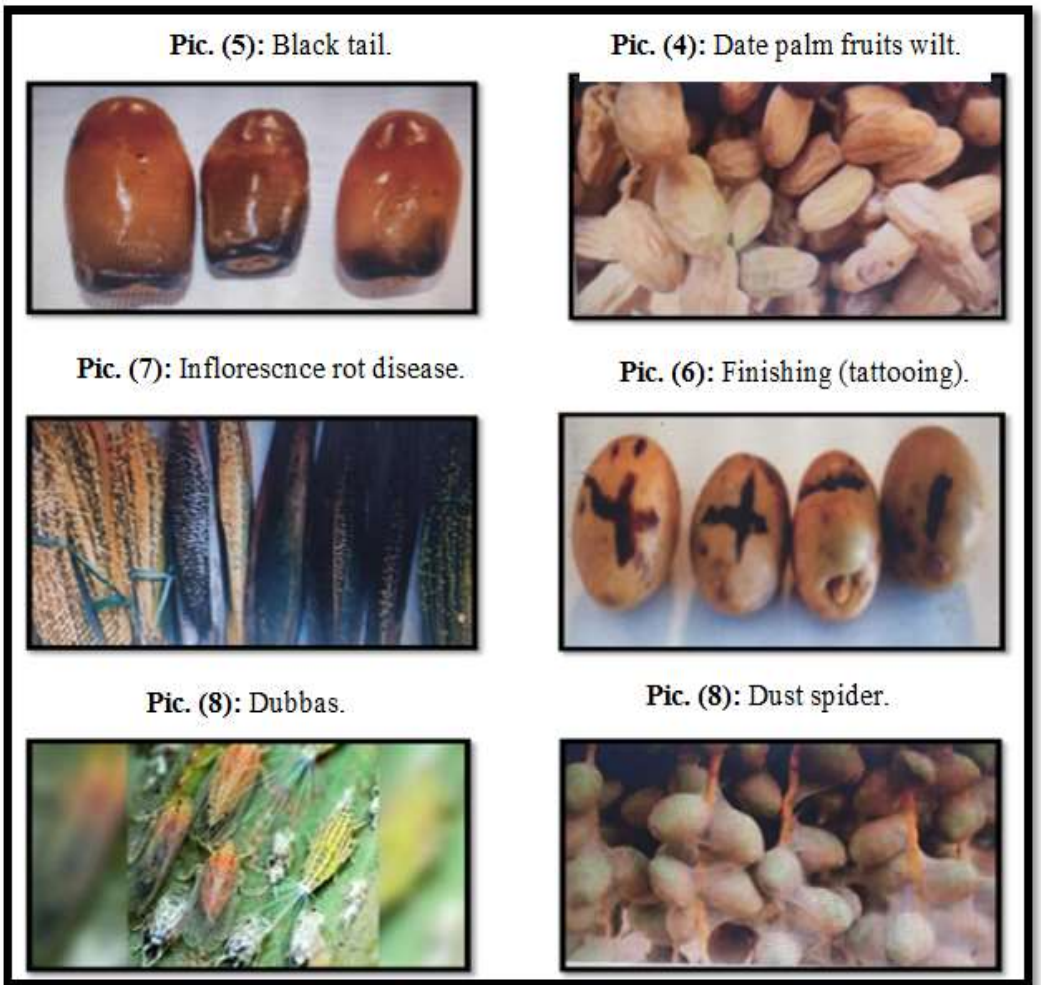
contents The fruit, which gradually changes its color to the dark color (to which the name of the insect belongs), and then its drying and falling, causing great losses in production before its maturity, reaching (80%) of the production of the affected palm (25), which makes the palm unproductive after wasting in water and agricultural operations conducted on it and is considered an economic loss and an obstacle to increasing the production of dates in the study area, and through the foregoing, the researchers see that the policy of producing dates in the study area and in Iraq needs a comprehensive renewal and review by the relevant authorities represented in the central and local government and the ministries of planning, agriculture and trade industry, water resources and the private sector to coordinate their efforts to develop dates production and industry in proportion to the demand for this national product, which can contribute to the diversification of Iraq's export structure by creating a Drivers to drain the surplus of dates to the Arab and international markets, which are almost the only agricultural product in which there is a surplus that can be exported and benefit from its economic return.



Source: Republic of Iraq, Ministry of Agriculture, Al-Muthanna Agriculture Directorate, Plant Protection Department, unpublished data, 2021.

Conclusions:

In light of what was analyzed about the obstacles to the development of palm tree cultivation and its production of dates in Al-Muthanna Governorate, the research reached a set of conclusions summarized as follows- :

1. The research revealed that the total number of date palm trees in the study area amounted to (1218643) palm trees, whose total production of dates in 2020 reached (38245) tons, constituting a percentage of (5.2%) of Iraq's total production of dates from the same year.

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2. Palm cultivation in the study area concentrates on an area of less than (7%) of its area, especially on the banks of the Euphrates River and its streams in an irregular or dense manner, especially in Samawah and Al-Khidr districts. study area.
3. Lack of manpower in palm orchards, lack of experience and high wages, in addition to that, dates are marketed in primitive ways, which increased their vulnerability to damage and loss. The study also revealed the absence of government agencies or civil bodies involved in the process of promoting and advertising dates in the study area and in Iraq.
4. The research revealed the effect of geographical factors (natural and human) and life factors in a clear way and the decline of orchard lands and impeding the development of date production in the study area.
5. There is no fixed and clear agricultural policy, especially for the production and marketing of dates, and the provision of rare and good seedlings at reasonable prices, and supports orchard owners in the necessary needs for planting palm trees.
6. Weakness in the application of the laws related to the protection of orchard lands and their encroachment and protection from the urban encroachment of facilities and random residential buildings.
7. Weakness and scarcity of agricultural research that encourages the development, development and marketing of dates and other palm products in the study area, in addition to the weak role of agricultural extension, which requires conducting orientation, training and information campaigns and establishing model farms for palm trees in the study area.

Suggestions:

1. Going to establish projects for planting palms in the lands of the Muthanna desert adjacent to the lands of Al-Majd district, Al-Khader district, Samawah district and Al-Salman district, especially in the regions of Al-Rehab and Wadi Kharaz, due to the availability of fertile soil and groundwater suitable for agriculture to contribute to increasing the number of palm trees and compensating the lands of the orchards that have been bypassed at the same time They act as sources of wind to protect cities and agricultural villages from dust storms that pass through the desert lands in the Muthanna Badia.
2. Applying laws and procedures that preserve and protect palm orchards from excessive cutting and providing pesticides and veterinary medicines that combat palm tree pests and their production.
3. Cultivation of palm trees with good, rare and desirable fruits and a lot of their offshoots for the purpose of their availability and selling to farmers at reasonable prices and the use of textile farming to provide farmers with various types of local and imported cuttings.
4. Organizing promotional and advertising campaigns on the nature of dates in the study area and Iraqi dates in general and linking the production of dates to the needs and requirements of local and international markets in a way that meets the needs and requirements of those markets and encouraging the private sector to practice exporting dates by providing credit and market facilities to it.
5. The introduction of modern agricultural mechanization in the cultivation of palm trees and the production of dates in order to overcome the problem of shortage of manpower and the increase in wages, and to keep pace with the requirements of developing dates, developing and improving their quality and increasing their quantities.
6. Giving local and foreign agricultural companies investment opportunities in development projects that contribute to the development of palm tree cultivation and improving its production in quantity and quality, and to encourage industrial investment in establishing factories and factories for filling and processing dates, such as producing molasses and jam, and introducing them as a basic material in the manufacture of cakes, biscuits and vinegar, and establishing complexes and cold stores. To absorb the large and surplus quantities in the palm harvest season, which will positively reflect on the economic situation of orchard owners and workers in this important agricultural sector.
7. Paying attention to studies and research that study pests, diseases and insects that affect palm trees and their production in cooperation with the College of Veterinary Medicine, the College of Agriculture and the College of Science at the University of Al-Muthanna in order to achieve the best methods of controlling and means of developing and developing good palm offshoots that suit the geographical environment in the study area.

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8. Providing the necessary technical, technical and material support to workers in the cultivation of palm trees for the purpose of overcoming the problems that hinder the development and production of palm trees, providing seedlings with good specifications, and conducting campaigns to combat pests, diseases and insects that infect palm trees and its fruits on a regular basis using agricultural helicopters.

Margins

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