

EPIDEMICS AFFECTING PALM TREES AND DATES IN ORGANIC AGRICULTURAL SYSTEM (MANAGEMENT AND FIGHTING) AND ECONOMIC REVENUE OF PALM TREES IN AL- BATEN PROJECT

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LECTURE SUMMARY

Al-Baten project in Al-Qaseem region, following to agricultural administration of Saleh Abdulaziz Al Rajhi Endowments Administration in Kingdom of Saudi Arabia, contains (200000) palm trees as the biggest date palms project in the world according to Guinness World Records (May 2005) including (32000) palm trees under the organic agricultural system at the rate of 16 % as an organic agricultural certificate has been obtained from the European certification authority for permanent development in France (Ecoscert) in August (2007) and renewed annually according to a serious of procedures and analyses to be done to the dates, seeds and soil. The project also obtained some international, regional, local specialty rewards and certificates. The organic section contains a remarkable group of special palm trees kinds whose ages ranges between one month to twenty years (Sokarri/ Khalas/ Saqey /Khodari/ Nabtat Saif / Nabtat Sultan/ Nabtat Ali/ Rashoudy /Hashishi/ / Sabaka/ Majdoul/ Daklat Nor/ Safawy/ Ajwat Medina/ Anbara / Fahoul) and average yield of the palm is 40 KG as for Sokarri. Palms trees under organic agriculture are exposed to many epidemics including insects. The most important of these insects are spadix moth, big and small date butterfly, termites, crustacean insects, palms Dupas and digging bugs (trunk digging bugs, bunch digging bugs and fronds digging bug with long horns) and disease epidemics including as the most important pollen Khayas, leaves scorch, fruit rottenness palms mites (*Akarouses*) (*Oligonychus afrasiaticus*), rodents, birds, grasses, snake larvae (Nimatoda) in addition to effect of weather condition such as cold. These epidemics are fought by herbicides and

pesticides allowed to be used in organic agriculture including micron Sulfur, plant extracts, mineral oil, powder and oil of Naym trees which gave good results. Cleaning the garden and early discovering of the epidemic by periodical inspection and use of light traps are the first defense lines for protection from these epidemics.

a- DEFINITIONS

First: about Saleh Abdulaziz Al Rajhi Endowments Administration

Saleh Abdulaziz Al Rajhi Endowments Administration (charitable organization) was established in the middle of 1417 H corresponding to 1997 when the Sheikh Saleh Abdulaziz Al Rajhi has dedicated some of his properties including real estates and farms as charitable endowments whose yield is spent in charitable works. Board of supervisors composed of a number of scientists and some of the sons of Shiekh Saleh Abdulaziz Al Rajhi supervise this administration.

Second: about agricultural department in Saleh Al Rajhi Endowments Administration

The agricultural administration supervises three agricultural projects that are interested in planting palms tress and producing dates. These projects are Al-Baten palms project (200000) palm trees in Al Qassim, Durmaa palms project (50000) palm trees in Durmaa Governorate and Al Ha'er & Tawfeq palms project (2085) palm trees south of Riyadh Region and all of which are located in the middle region of the kingdom of Saudi Arabia.

Third: about Al-Baten palms project

Al- Baten Project has been awarded many specialty certificates and some international and local awards (concerned with food security) in addition to some scientific books as the following:

a- CERTIFICATES

- 1- The project is the biggest date palm trees project in the world according to Juinness World Records (May 2005)
- 2- Obtaining 14 statements from 2001 to 2014 consequently from some scientific laboratories stating that products of agricultural administration (dates) are free from insecticides remains.
- 3- Obtaining organic agricultural certificate from the European certification authority for permanent development in France (Ecosert) from 2007 and renewed annually according to a series of managerial and technical procedures.

- 4- Obtaining Saudi national slogan of organic products in 2012 and renewed annually according to a series of managerial and technical procedures.
- 5- Obtaining Global Good Agricultural Practices in 2013 for two projects of agricultural administration (Al-Baten - Durmaa) and has been renewed in 2015.
- 6- Obtaining ISO 9001: 2008 certificate concerning quality management system in 2014.
- 7- Obtaining ISO 22000:2005 certificate concerning food safety management in 2014.
- 8- Preparing is in progress for obtaining ISO 14001 certificate concerning system of environment quality.

b- AWARDS

- 1- The project came in the second rank in Prince Faisal Bin Bandar Award for palm trees in the model farms in Al Qassim in its second round in 1429 H (2008).
- 2- The project came in the first rank in Khalifa International Date Palm Award (category of distinct producers) in the field of palm trees agriculture and producing dates in its second round in 2010.
- 3- Agricultural department of Endowments Administration obtained medal of the international day of food from the Food and Agriculture Organization (FAO) in cooperation with Ministry of Agriculture in Kingdom of Saudi Arabia as a supporter for international food safety in 2011.
- 4- The project was given the first award of Prince Faisal Bin Bandar Date Award (category of dates and palm trees service) in 1433 H (2012).
- 5- The project has been awarded the distinction award in food works in 2014 (category of the best producing farm and the biggest qualified farm according to international quality requirements in the Arab world) from international expertise house during food works conference held in the United Arab Emirates in 2014.

c- PUBLICATIONS

- 1- Writing the book entitled (planting and managing projects of palm trees) 2008, 217 p.
- 2- Preparing comprehensive agricultural calendar for serving palm trees, 2010 edition, advanced second edition is in press for evaluating.
- 3- Writing the book entitled (organic agriculture of palm trees), 217 p.
- 4- Writing the book entitled (secondary products of the palm trees, kinds and economic importance), 240 p, in press

- 5- Preparing 14 papers and general lectures by which the agricultural department participated in scientific conferences and seminars inside and outside the Kingdom of Saudi Arabia.
- 6- Preparing (49) articles published in 10 Arab and gulf magazines.

b- LECTURE ITEMS

First: kinds of palms under study and distributing the produced dates

Kinds of palms under organic agriculture system belong to three categories: category of excellent kinds which include (Sokarri/ Khalas/ Saqeyi /Khodari), category of good kinds which include (Nabtat Saif / Nabtat Sultan/ Nabtat Ali/ Rashoudy /Hashishi/ / Sabaka/ Wanan) and category of rare kinds which include (Majdoul/ Daklat Nor/ Safawy/ Ajwat Medina/ Anbara) in addition to Fahoul. Ages of palms ranges between one month to 20 years. Number of palms differs from one kind to another where number of palms of one kind from (18 palm trees to 18000 palm trees) with a total number (32000) palm trees representing 16 % of the number of palm trees of Al-Baten Project.

Dates production from the organic field is approximately (500) ton annually representing 10 % of the project yield, one part of the yield is sold and the other part is distributed to charitable organizations inside the kingdom of Saudi Arabia and visitors of the two Holy Mosques during performing Pilgrimage and minor hajj seasons.

Second: the most important epidemics affecting date palms (under organic agriculture system), time of occurrence and applied fighting and protection program

Epidemics and diseases of the palms which occur in Al-Baten project are divided into groups according to kind of epidemic. Time of occurrence of the epidemic is determined to facilitate for the garden supervisor to know the time of its occurrence according to weathers of the middle region in the Kingdom of Saudi Arabia as well as methods of fighting and protection for every group in the following table:

a- The most important insect epidemics

S.N	Epidemic	Time of occurrence	Fighting and protection program and the used materials
1	crustaceous insects	Autumn and Spring	* mineral oil 96 % at the rate of 10 liters/100 liters of water
2	Spadix moth	At the start of spadix occurrence (February and march)	* covering with micron sulfur at the rate of 50 g/palm * not using infected pollens
3	Big and small date butterflies, trunk digging bugs, bunch digging bugs and fronds digging bug with long horns	From the start of February to the end of July	* Light traps whether from direct electric source or from solar cells. * Trilogy pesticide (Naym oil) at the rate of 2 liter / 1000 liters of water or Nymex pesticide 70 % at the same rate. * Mechanical fighting of larvae of bunch digging bugs (Ancara) in palms pool. * Tricograma sponges for sponging on butterflies but its results are not good.
4	Palms Dupas	March- April - September - October	Two consecutive sprays by Ferry powder (10 days between the two sprays)
5	Termite	Around the year	Removing the dry palm leaves or any dry remains in the organic field
6	Stores insects	In stores (September - November) during separation	* striking electrical traps. * Cleaning the stores and closing them tightly. * Isolating the dates periodically and separating the isolation products.

b- The most important Disease epidemics

1-	Spadix Khays disease (Khameg)	Upon occurring the spadix and after falling rain	* Not using infected pollens. * covering with micron sulfur at the rate of 50 g/palm
2	Palm scorches leaves	Spring, summer and autumn	* Micron sulfur, 80 % at the rate of 2.5 g/ 1000 liters of water after harvesting.
3	Bunch mange	May- June	* Micron sulfur, 80 % at the rate of 2.5 g/ 1000 liters of water after harvesting.
4	Fruit rottenness	June- July	* copper compounds 6 % at the rate of 2 liter/ 100 liters of water

c- Grass

Grasses with wide and thin leaves (annual and long-lived)	Around the year	* organic fertilizers without pesticide of grasses seeds * Black plastic for covering palms pools. * Ground palm leaves for covering the pools then it is decayed as a fertilizer.
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d- Rodents

Rodents	Around the year	* destroying rodents installments mechanically * Rodents insecticides by using poisonous lure traps. * Putting Phostoxin tablets in the holes then closing.
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e- Birds

Birds	July	* muzzling the bunches after protective spraying
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f- Effect of environmental conditions

Environmental conditions	Winter	* cold and frost
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Note: the mineral oil is used with all agricultural pesticides (insect – fungal-Akarouses) as a spraying component and at the rate of 1 liter/ 1000 liters of water which increase efficiency and effectiveness of the pesticides and its adherence for the longest time to the leaves surface.

Third: department of fighting palms and dates epidemics in the field and stores

a- Ways protecting from dates and palms epidemics in the field:

- 1- Following protective ways for protecting the palm shoot from diseases and epidemics (before- during- after) planting.
- 2- Cleaning the fields of palms, cutting, collecting infected palm leaves, bunches and shoots and transporting them outside the field and getting rid of them in suitable ways.
- 3- Following a balanced feeding program based on results of analyzing samples of soil, water and tissues of palm leaves.
- 4- Following rationed irrigation program based on age of the palm, soil kind and weather conditions.
- 5- Destroying holes of rodents and rats mechanically to limit the use of pesticides.
- 6- The importance of early discovering of epidemics and diseases and fighting them manually if possible.
- 7- Using Carmon pheromone and light traps.
- 8- Spraying bunch with water during stage of coloring to get rid of dust and effects of pesticides.
- 9- Muzzling the bunch to limit its exposure to dust and affecting with birds and epidemics.
- 10- Harvesting in the suitable time and ending before the end of October and isolating the fallen dates from the dates under harvesting.
- 11- Planting wind repellents as possible on the borders of the fields to limit the dusts, Naym trees are preferred as repellent.
- 12- Performing protective spraying by using mix of fungicides and pesticides recommended to be used in organic fields after the end of cutting off.
- 13- Spraying roads inside the field with water and remains of oils to reduce the dusts.
- 14- Recycling results of clipping for manufacturing compost and destroying epidemics inside it.

b- Ways protecting from dates epidemics in the stores:

- 1- Observing technical specifications when establishing stores for separating the dates.
- 2- Purifying the stores before harvesting by using mix of safe fungicides and pesticides.
- 3- Cleaning the stores (floors and walls) with water immediately before receiving the dates.
- 4- Tightly closing doors and windows and putting net on them.
- 5- Putting striking electrical traps in stores for attracting stores insects if any.
- 6- Dates are compressed by good Molassing by evacuating the bags so the growing of the insects stop and insects' phases inside them are destroyed.
- 7- Keeping the dates in the cooling stores stop growth and reproduction of insects.
- 8- Separating fallen and infected dates and keeping them away from the good dates.

Fourth: economic revenue of the palm

(Sokarri "17 years age" as example) in Riyals

a- Average cost of the fruitful palm (Sokarri) in organic agriculture compared to clean agriculture

S.N.	Kind of costs	Organic agriculture	Clean agriculture
1	Amount spent for the fruitful palm	33	33
	Cost of fruitful palm from amount spent in the fixed assets	6	6
2	Cost of the palm from managerial and general costs	13	13
3	Cost of the palm from pollens	7	7
4	Cost of the palm as for the workers (pollination-servicing head and pool of the palm- fertilization-spraying- harvesting)	45	35
5	Cost of palm as for workers (for improving product quality)	40	30
6	Cost of palm as for fertilizers	14	9
7	Cost of palm as for pesticides	9	7
8	Cost of palm as for puzzling bags	4	4
9	Cost of palm as for fuels	10	10
Total		181	154

b- Average yield of dates for the palm under (organic agriculture) system compared to (clean agriculture)

S.N	Statement	Organic agriculture	Clean agriculture
1	average Palm revenue / kg	40	60
2	Average price of Kilogram/Riyal	14-18 (average 16)	8 – 12 (average 10)
3	revenue/ riyal	560-720 (average 640)	480-720 (average 600)
4	Palm cost/riyal/year	181	154
5	Net revenue of the palm /riyal *	379 – 590 (average 485)	326 – 566 (average 446)

* In addition to the value of the palm shoots whose number and price is different from one kind to another.

FIFTH: RECOMMENDATIONS

- 1- Defining the importance and benefit of organic agriculture and spreading food awareness towards organic dates.
- 2- Looking for new requirements of fertilizers, pesticides especially herbicides for organic producing.
- 3- Activating role of supervising the mechanism of applying agricultural programs.
- 4- Compliance with implementing the rules and regulations applied by authorities and organizations supervising organic agriculture.
- 5- Adhering to renewing the organic agriculture certificate annually by the concerned authorities.
- 6- Studying sensitivity of the different kinds for epidemics affecting the palms.
- 7- Gradual study-based transformation from traditional agriculture to clean agriculture then organic agriculture.
- 8- Seeking to maximizing the revenue of the one palm by the following:
 - a- Choosing the economic kind when planting.
 - b- Seeking to increase production quantity for each palm.
 - c- Improving quality of the product for competition.
 - d- Rationalizing costs in a way that doesn't affect implementing agricultural programs.