Sultanate of Oman

Ministry of Education

Om A l Hakam Bint Al Zubair Basic School (1-10)

Investigation of Temperature Humidity Index On Ommatissus Binotatus Lybicus in Date Palms Farms of Jazir.

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Abstract:

This study aims to investigate the temperature - humidity Index on in dates palms Dubas in farms of Al Jazir at Qaryat State, in order to answer the following questions:

1- What are the reasons beyond the spread of the Dubas in the village of Al-Jazir?
2- What is the effect of temperature and humidity on Dubas palm insect?

This project was implemented in the village of Al-Jazir. The people noticed the spread of Dubas, which causes damage, so we decided to plan to act , started visits to investigate the two regions of Al-Jazir.

We conducted taking of site measures coordinates, temperature and humidity index of Al Jazir village, we found that there is no distance of seven meters. Through the interview we found that the reasons is that farmers don't take care of the palms, irregular cultivation, high density between palms, and the effect of humidity and heat. We created a vaccine anti-palm bug, we noticed the bug's died quickly (which is a juice of basil, pepper and lemon juice) we sent it to the General Directorate of Agricultural Research, Fisheries and Water Resources in Muscat; To know the affects the insect, because of the insect's dormancy during the month of February, we are waiting for the result of the effect of the vaccine on the insect.

We concluded that there is a relationship between temperature, humidity and the insect spread increase through the data of the Meteorological Center, the temperature and humidity index in this year at the state of Quriyatis higher than the previous years. The most important recommendations are to educate farmers about the need to take continuous care of trees, leaving a distance of seven meters, and address the competent authorities to treat this type of insects.

Scientific terms: Ommatissus Binotatus Lybicus locally known as AL Mutaq .

Homoptera or Tropiduchidaeuh Family of palm dubas insects. ((Department of Development Information. 2011

Humidity(mositure) : An expression that refers to the amount of liquid, especially water, present in a body, whether it is in the gaseous state or in the solid state.

Air Humidity. (en.wikipedia.org/wiki/)

Biological Control: It is the control using parasites of the Hymenoptera class that parasitize the eggs of Dubas.

(Developmental Media Department. 2010).

The study Questions :

1- What are the reasons of the spread of the Dubas palm bug in the village of Al-Jazir farms?
2- What is the effect of heat and humidity on dubs palm?

The study Plan:

Time Duration	Task	Method	Executant
October	Selection and formulation of a research problem.	Field visit to the study's site	St . Zamzam Batashia . St .Hoor Al Naibyia
November	Data collection **.**	Interview with Eng. Yahya Al Darmaki	St . Zamzam Batashia . St .Hoor Al Naibyia
December	Temperature and Humidity Measurement .	Apply the atmospheric protocol using a surface temperature and humidity	St . Zamzam Batashia . St .Hoor Al Naibyia
January	Discuss the results , summary, and write recommendations.	Supervising teacher and team members meeting	T. Sheikha Al Moawaliya.
February	Research review, final output and presentation preparation	-	T. Sheikha Al Moawaliya

Introduction and literature review:

God honored trees, but palm tree is exposed to many insect that affect its productivity, and reduces the outcome in addition to the lack of care, which negatively affected the general production of dates in the Sultanate. The study sheds light on the phenomenon of the spread of the palm Dubas, which causes honey secretions, spreading in the rest of the trees. Coordination was made with the specialists at the Agricultural Wealth Center to conduct the interview. We discovered that reasons of the Dubas insect is irregularity of cultivation, lack of care, and humidity which is the most prominent factor of the insect development, in addition to the high density of trees .The insect often spreads in old farms, the damage of dubas on palms in winter is less than in summer due to temperature's drop.

According to a study published in the Journal of the Date Palm in 1998, palm bug prefers shade and high humidity, therefore it invades palm trees planted at narrow distances, as is the case in mountain farms, valleys and in the yards of houses, but trees that are planted according to the recommended distances, are rarely infected by this insect.

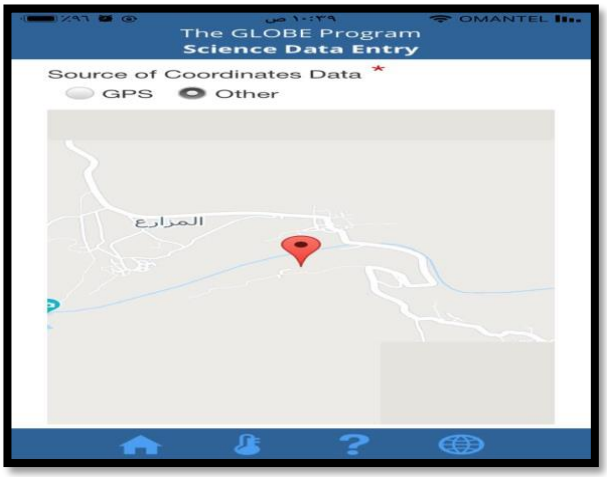
For the necessity of the research, coordination was made with the center to send samples of the vaccine to fight the palm Dubas which we tested (biological control), but its efficiency has not yet been proven by authorities in Muscat, because the problem causes great damage to palm trees.

Research methods :

Study location:

The plan of this research was implemented in (Sultanate of Oman - Governorate of Muscat) the state of Quriyat, the village of Al-Jazir farms , in October, the weather was hot (42C) and by applying the weather protocol.

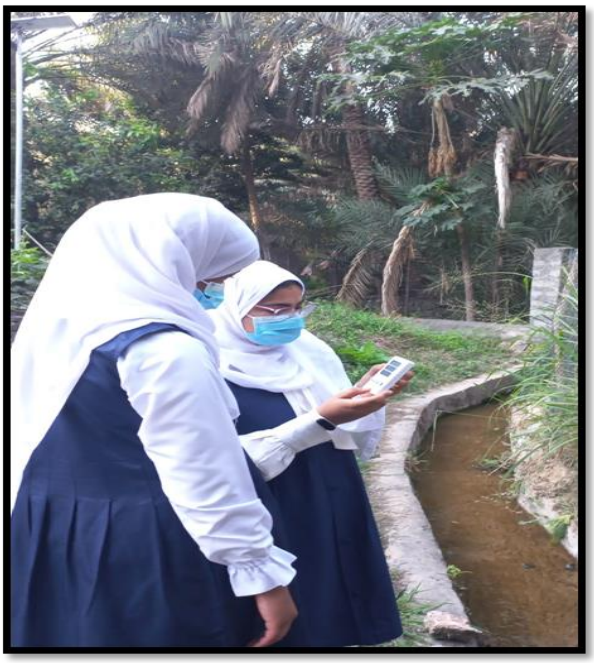
The maps below show this geographical area:



Data collection and analysis:

The first question data was collected through an official address to the Agricultural Development Center in order to conduct an interview with the director of the center Eng. Yahya Al Darmaki and Eng. Zahra Al Hadidiya. We found that the reasons for the emergence of the Dubas palm bug are: (the farmers not taking care of the palms, irregular cultivation, the high density of palm trees and humidity effect).

The second question data was collected by taking the atmospheric protocol application, measuring the air temperature and the air relative humidity; we found a rise in temperature and humidity during the months September-October-November-December, which witnessed an increase in the (Mataq) substance.



Results:

Via communicating with the Department of Meteorology and Special Forecasting, Mr. Mahmoud Al-Khiari, to provide us with the temperatures and humidity index in the state of Quriyat during the months from September 2021 to February 2022: We found that there is a remarkable rise in temperatures in these months.

Date(TL)	Qurayyat Temp.Dry.Max [deg C]	Qurayyat Temp.Dry.Min [deg C]	Qurayyat Temp.Dry [deg C]	Qurayyat RelHumidity [%]
٢٠٢١-٠٩-٠١ ٠٠:٠٠:٠٠	٣٠,٤	٣٠,٢	٣٠,٣	٦٧
٢٠٢١-٠٩-٠٢ ٠٠:٠٠:٠٠	٣١,٦	٣١,٣	٣١,٣	٦٣
٢٠٢١-٠٩-٠٣ ٠٠:٠٠:٠٠	٣٢,٧	٣١,٣	٣١,٣	٧٥
٢٠٢١-٠٩-٠٤ ٠٠:٠٠:٠٠	٣٦	٣٢,١	٣٢,٢	٦٨
٢٠٢١-٠٩-٠٥ ٠٠:٠٠:٠٠	٣٣,٦	٣١,٤	٣١,٦	٦٧
٢٠٢١-٠٩-٠٦ ٠٠:٠٠:٠٠	٣٢,٧	٣١,٧	٣١,٧	٦٥
٢٠٢١-٠٩-٠٧ ٠٠:٠٠:٠٠	٣٠,٨	٣٠,٥	٣٠,٥	٨٥
٢٠٢١-٠٩-٠٨ ٠٠:٠٠:٠٠	٣٢	٣٠,٩	٣٠,٩	٧٩
٢٠٢١-٠٩-٠٩ ٠٠:٠٠:٠٠	٣٢,٢	٣٢	٣٢,١	٧١
٢٠٢١-٠٩-١١ ٠٠:٠٠:٠٠	٣١,٤	٣٠,٩	٣٠,٩	٧٧
٢٠٢١-٠٩-١٢ ٠٠:٠٠:٠٠	٣٢,٣	٣١,٩	٣٢	٧٠
٢٠٢١-٠٩-١٣ ٠٠:٠٠:٠٠	٣١,٥	٣١,٣	٣١,٣	٧٠
٢٠٢١-٠٩-١٤ ٠٠:٠٠:٠٠	٣٤,٤	٣٣,٢	٣٤,٤	٣٦
٢٠٢١-٠٩-١٥ ٠٠:٠٠:٠٠	٣١,٤	٣٠,٦	٣٠,٦	٧٧
٢٠٢١-٠٩-١٦ ٠٠:٠٠:٠٠	٣١,١	٣٠,٧	٣١	٦٧
٢٠٢١-٠٩-١٧ ٠٠:٠٠:٠٠	٣١,٢	٣٠,٥	٣٠,٥	٧٣
٢٠٢١-٠٩-١٨ ٠٠:٠٠:٠٠	٣٢,٣	٣٢	٣٢,١	٦٦
٢٠٢١-٠٩-١٩ ٠٠:٠٠:٠٠	٣١,١	٣٠,٥	٣٠,٥	٧٧
٢٠٢١-٠٩-٢٢ ٠٠:٠٠:٠٠	٣٢,٩	٣١,٦	٣٢,٨	٥٣
٢٠٢١-٠٩-٢٣ ٠٠:٠٠:٠٠	٣٢,٦	٣١,٦	٣٢,٦	٤٩
٢٠٢١-٠٩-٢٤ ٠٠:٠٠:٠٠	٣٠,١	٢٩,٨	٢٩,٩	٨٦
٢٠٢١-٠٩-٢٥ ٠٠:٠٠:٠٠	٣٠	٢٩,٩	٣٠	٧٦
٢٠٢١-٠٩-٢٦ ٠٠:٠٠:٠٠	٣١,٩	٣١,٤	٣١,٩	٥٦
٢٠٢١-٠٩-٢٧ ٠٠:٠٠:٠٠	٣٠,٩	٣٠,٧	٣٠,٧	٧٥
٢٠٢١-٠٩-٢٨ ٠٠:٠٠:٠٠	٣٠,١	٢٩,٦	٢٩,٦	٧٤
٢٠٢١-٠٩-٢٩ ٠٠:٠٠:٠٠	٣٠,٥	٣٠,٣	٣٠,٥	٧٦

Appendix (1) Temperature & humidity index at Qurayyat state on Sempteber .

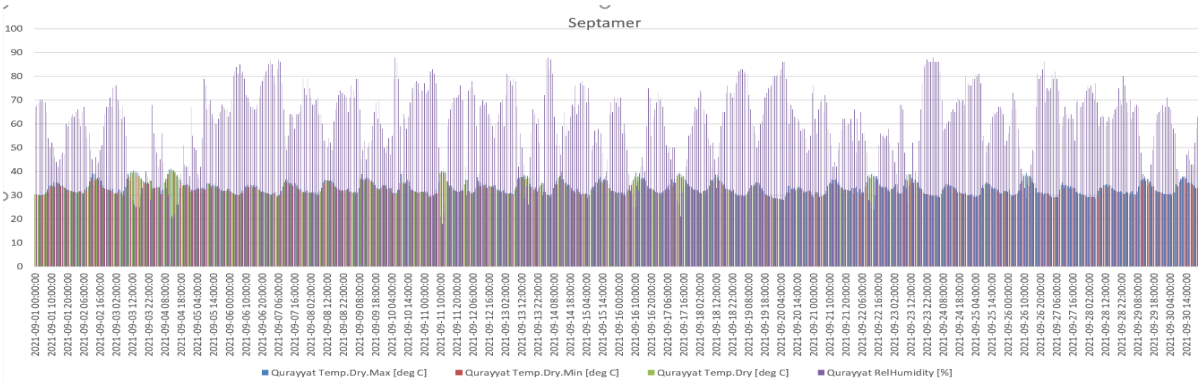


Diagram (1) Temperature & humidity index at Qurayyat state on Sempteber .

Date(TL)	Qurayyat Temp.Dry.Max [deg C]	Qurayyat Temp.Dry.Min [deg C]	Qurayyat Temp.Dry [deg C]	Qurayyat RelHumidity [%]
٢٠٢١-١٠-٠١ ٠٠:٠٠:٠٠	٣٣,٦	٣١,٥	٣١,٥	٦٨
٢٠٢١-١٠-٠٢ ٠٠:٠٠:٠٠	٣١,٨	٣١,٢	٣١,٨	٥٥
٢٠٢١-١٠-٠٣ ٠٠:٠٠:٠٠	٢٨,٦	٢٦,٥	٢٨	٥٧
٢٠٢١-١٠-٠٤ ٠٠:٠٠:٠٠	٣٠,٢	٢٩,٦	٢٩,٦	٦٦
٢٠٢١-١٠-٠٥ ٠٠:٠٠:٠٠	٢٧,٨	٢٧,٧	٢٧,٧	٨٧
٢٠٢١-١٠-٠٦ ٠٠:٠٠:٠٠	٢٨,٥	٢٨,٣	٢٨,٥	٨١
٢٠٢١-١٠-٠٧ ٠٠:٠٠:٠٠	٢٨,١	٢٧,٦	٢٧,٦	٨٣
٢٠٢١-١٠-٠٨ ٠٠:٠٠:٠٠	٢٨,٤	٢٧,٦	٢٧,٨	٧٨
٢٠٢١-١٠-٠٩ ٠٠:٠٠:٠٠	٢٩,٦	٢٨,٨	٢٨,٨	٥٥
٢٠٢١-١٠-١٠ ٠٠:٠٠:٠٠	٣٠,٢	٢٨,٧	٢٨,٧	٦٦
٢٠٢١-١٠-١١ ٠٠:٠٠:٠٠	٢٩,٣	٢٨,٨	٢٩,٣	٧٢
٢٠٢١-١٠-١٢ ٠٠:٠٠:٠٠	٢٩,٧	٢٨,٨	٢٨,٩	٤٦
٢٠٢١-١٠-١٣ ٠٠:٠٠:٠٠	٢٩,٧	٢٨,٧	٢٩,٦	٣٤
٢٠٢١-١٠-١٤ ٠٠:٠٠:٠٠	٢٩,٤	٢٦,٢	٢٦,٤	٧٦
٢٠٢١-١٠-١٥ ٠٠:٠٠:٠٠	٢٩,٧	٢٥,٩	٢٦,٣	٦٠
٢٠٢١-١٠-١٦ ٠٠:٠٠:٠٠	٢٩,٢	٢٨,٣	٢٨,٣	٥٣
٢٠٢١-١٠-١٧ ٠٠:٠٠:٠٠	٢٨	٢٦,٧	٢٧,٩	٤٩
٢٠٢١-١٠-١٨ ٠٠:٠٠:٠٠	٣٠	٢٦,٦	٢٦,٧	٦٩
٢٠٢١-١٠-١٩ ٠٠:٠٠:٠٠	٢٨,٩	٢٨	٢٨,٩	٥٤
٢٠٢١-١٠-٢٠ ٠٠:٠٠:٠٠	٢٩	٢٨,٢	٢٨,٥	٧٦
٢٠٢١-١٠-٢١ ٠٠:٠٠:٠٠	٢٨,٦	٢٨,٤	٢٨,٤	٧١
٢٠٢١-١٠-٢٣ ٠٠:٠٠:٠٠	٢٨	٢٧,٨	٢٨	٧٣
٢٠٢١-١٠-٢٤ ٠٠:٠٠:٠٠	٢٨,٤	٢٧,٥	٢٧,٥	٥٥
٢٠٢١-١٠-٢٥ ٠٠:٠٠:٠٠	٢٨,٧	٢٨,٤	٢٨,٤	٧٤
٢٠٢١-١٠-٢٦ ٠٠:٠٠:٠٠	٢٧,٧	٢٧,٣	٢٧,٤	٧٧
٢٠٢١-١٠-٢٧ ٠٠:٠٠:٠٠	٢٨,٤	٢٨	٢٨	٧٥
٢٠٢١-١٠-٢٨ ٠٠:٠٠:٠٠	٢٧,٧	٢٧,٦	٢٧,٦	٧٢
٢٠٢١-١٠-٢٩ ٠٠:٠٠:٠٠	٢٦,٣	٢٥,٨	٢٥,٨	٧٤
٢٠٢١-١٠-٣٠ ٠٠:٠٠:٠٠	٢٦,٥	٢٥,٤	٢٥,٤	٦٣
٢٠٢١-١٠-٣١ ٠٠:٠٠:٠٠	٣٠,٦	٢٦,٦	٣٠,٥	٢٢

Appendix (2) Temperature & humidity index at Qurayyat state on October

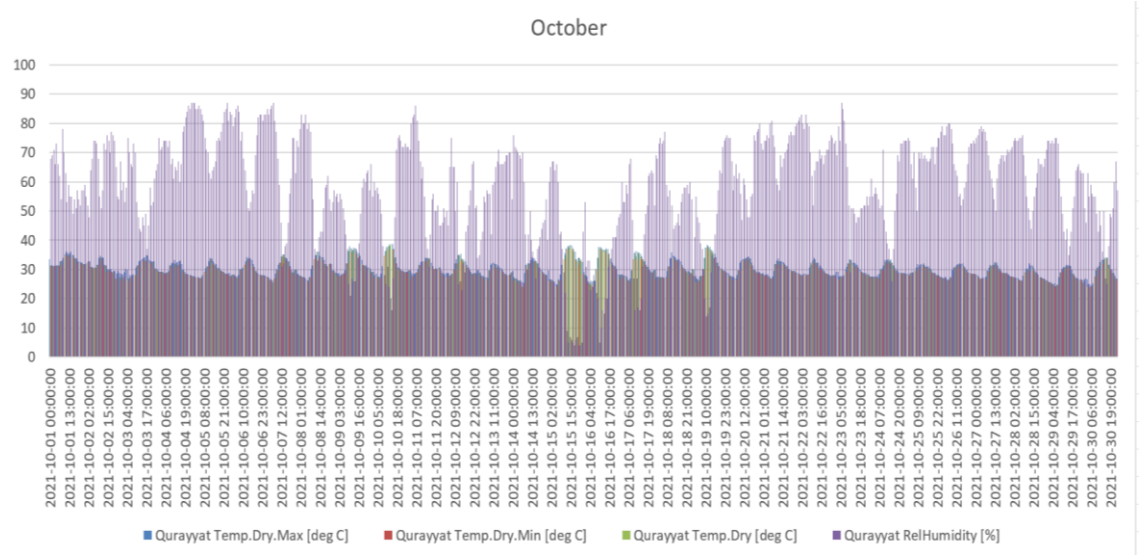


Diagram (2) Temperature & humidity index at Qurayyat state on October

.

Date(TL)	Qurayyat Temp.Dry.Max [deg C]	Qurayyat Temp.Dry.Min [deg C]	Qurayyat Temp.Dry [deg C]	Qurayyat RelHumidity [%]
٢٠٢١-١١-٠١ ٠٠:٠٠:٠٠	٢٨,٣	٢٧	٢٧,٣	٦٣
٢٠٢١-١١-٠٢ ٠٠:٠٠:٠٠	٣٣,٢	٣١,١	٣١,٩	١٤
٢٠٢١-١١-٠٣ ٠٠:٠٠:٠٠	٢٦,٥	٢٥,٨	٢٥,٨	٨١
٢٠٢١-١١-٠٤ ٠٠:٠٠:٠٠	٢٦	٢٥,٣	٢٥,٥	٦٨
٢٠٢١-١١-٠٥ ٠٠:٠٠:٠٠	٢٥,٦	٢٤,٧	٢٤,٧	٦٦
٢٠٢١-١١-٠٦ ٠٠:٠٠:٠٠	٢٥,٨	٢٤,٥	٢٤,٧	٦٦
٢٠٢١-١١-٠٧ ٠٠:٠٠:٠٠	٢٥,٤	٢٤,٩	٢٥	٦٦
٢٠٢١-١١-٠٨ ٠٠:٠٠:٠٠	٢٥,٧	٢٥,٤	٢٥,٦	٦٥
٢٠٢١-١١-٠٩ ٠٠:٠٠:٠٠	٢٥,٧	٢٤,٨	٢٤,٩	٦٦
٢٠٢١-١١-١٠ ٠٠:٠٠:٠٠	٢٥,٧	٢٥,٤	٢٥,٤	٦٢
٢٠٢١-١١-١١ ٠٠:٠٠:٠٠	٢٥,٣	٢٤,٩	٢٤,٩	٦٦
٢٠٢١-١١-١٢ ٠٠:٠٠:٠٠	٢٥,٢	٢٤,٩	٢٤,٩	٦٢
٢٠٢١-١١-١٣ ٠٠:٠٠:٠٠	٢٦,٤	٢٤,٣	٢٦,٤	٢٨
٢٠٢١-١١-١٤ ٠٠:٠٠:٠٠	٢٥,٩	٢٤,٧	٢٤,٧	٥٤
٢٠٢١-١١-١٥ ٠٠:٠٠:٠٠	٢٦,٤	٢٥,٧	٢٦,٣	٥٧
٢٠٢١-١١-١٦ ٠٠:٠٠:٠٠	٢٥,١	٢٤,٣	٢٤,٣	٤٩
٢٠٢١-١١-١٧ ٠٠:٠٠:٠٠	٢٤,٦	٢٤,٢	٢٤,٢	٥٦
٢٠٢١-١١-١٨ ٠٠:٠٠:٠٠	٢٤,٨	٢٣,٨	٢٤,٣	٥٦
٢٠٢١-١١-١٩ ٠٠:٠٠:٠٠	٢٤,٢	٢٣,٥	٢٣,٦	٦٢
٢٠٢١-١١-٢٠ ٠٠:٠٠:٠٠	٢٤	٢٣,٦	٢٣,٨	٦٢
٢٠٢١-١١-٢١ ٠٠:٠٠:٠٠	٢٤,٣	٢٤	٢٤	٥٥
٢٠٢١-١١-٢٢ ٠٠:٠٠:٠٠	٢٢,٨	٢٢,٤	٢٢,٤	٦١
٢٠٢١-١١-٢٣ ٠٠:٠٠:٠٠	٢٢,٤	٢١,٨	٢١,٨	٦٧
٢٠٢١-١١-٢٤ ٠٠:٠٠:٠٠	٢٣,٤	٢٣	٢٣,٢	٤٢
٢٠٢١-١١-٢٥ ٠٠:٠٠:٠٠	٢٩	٢٧,٢	٢٨,٩	٢٣
٢٠٢١-١١-٢٦ ٠٠:٠٠:٠٠	٢٥,٢	٢٤,١	٢٤,٢	٧٦
٢٠٢١-١١-٢٧ ٠٠:٠٠:٠٠	٢٦,٢	٢٥,٥	٢٥,٥	٦٢
٢٠٢١-١١-٢٨ ٠٠:٠٠:٠٠	٢٣,٧	٢٣,٢	٢٣,٥	٦١
٢٠٢١-١١-٢٩ ٠٠:٠٠:٠٠	٢٤,٦	٢٣,٥	٢٣,٥	٧٣
٢٠٢١-١١-٣٠ ٠٠:٠٠:٠٠	٢٥	٢٤,٥	٢٤,٥	٧١

Appendix (3) Temperature & humidity index at Qurayyat state on November.

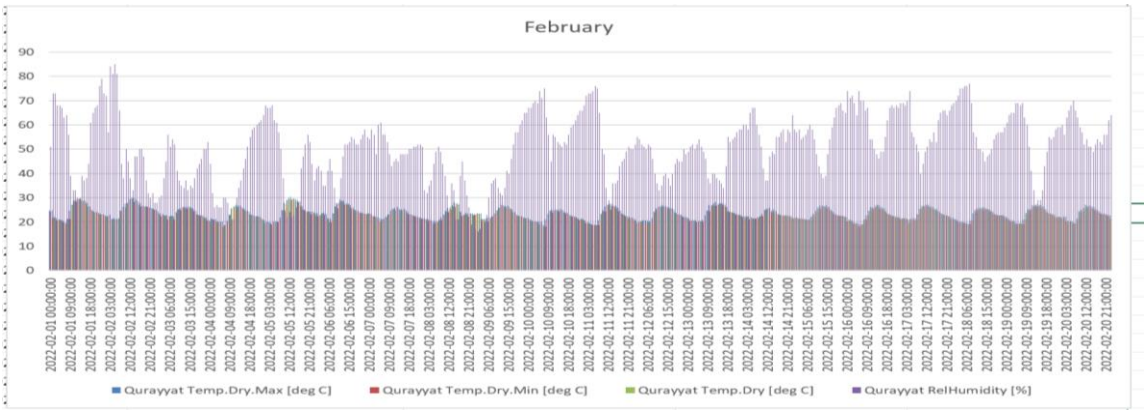


Diagram (3) Temperature & humidity index at Qurayyat state on November .

Date(TL)	Qurayyat Temp.Dry.Max [deg C]	Qurayyat Temp.Dry.Min [deg C]	Qurayyat Temp.Dry [deg C]	Qurayyat RelHumidity [%]
٢٠٢١-١٢-٠١ ٠٠:٠٠:٠٠	٢٢,٦	٢١,٧	٢٢,٦	٦٢
٢٠٢١-١٢-٠٢ ٠٠:٠٠:٠٠	٢٢,٩	٢٢,٣	٢٢,٣	٨٤
٢٠٢١-١٢-٠٣ ٠٠:٠٠:٠٠	٢٣	٢٢,٥	٢٢,٥	٧٦
٢٠٢١-١٢-٠٤ ٠٠:٠٠:٠٠	٢٣,٤	٢٢,٦	٢٣,٤	٧٣
٢٠٢١-١٢-٠٥ ٠٠:٠٠:٠٠	٢٤,٢	٢٣,٧	٢٣,٧	٧١
٢٠٢١-١٢-٠٦ ٠٠:٠٠:٠٠	٢٤	٢٣,٥	٢٣,٨	٦٨
٢٠٢١-١٢-٠٧ ٠٠:٠٠:٠٠	٢٣,٦	٢٣,١	٢٣,٥	٦٨
٢٠٢١-١٢-٠٨ ٠٠:٠٠:٠٠	٢٤,١	٢٣,٧	٢٣,٨	٦٩
٢٠٢١-١٢-٠٩ ٠٠:٠٠:٠٠	٢١,٧	٢١,٤	٢١,٤	٦٠
٢٠٢١-١٢-١٠ ٠٠:٠٠:٠٠	٢١,٩	٢١,٣	٢١,٦	٥٩
٢٠٢١-١٢-١١ ٠٠:٠٠:٠٠	٢١,٦	٢١,٢	٢١,٦	٥١
٢٠٢١-١٢-١٢ ٠٠:٠٠:٠٠	٢٢	٢١,٦	٢١,٦	٥٧
٢٠٢١-١٢-١٣ ٠٠:٠٠:٠٠	٢٣	٢١,٤	٢٣	٥٢
٢٠٢١-١٢-١٤ ٠٠:٠٠:٠٠	٢٢,٧	٢٢,٣	٢٢,٣	٦٠
٢٠٢١-١٢-١٥ ٠٠:٠٠:٠٠	٢١,٧	٢٠,٩	٢١,٢	٦٠
٢٠٢١-١٢-١٦ ٠٠:٠٠:٠٠	٢١,٧	٢١,٤	٢١,٤	٥٣
٢٠٢١-١٢-١٧ ٠٠:٠٠:٠٠	٢٢,١	٢١,٤	٢١,٥	٥٨
٢٠٢١-١٢-١٨ ٠٠:٠٠:٠٠	٢١,٥	٢١,١	٢١,٣	٥٤
٢٠٢١-١٢-١٩ ٠٠:٠٠:٠٠	٢١,٩	٢١,٥	٢١,٦	٦٥
٢٠٢١-١٢-٢٠ ٠٠:٠٠:٠٠	٢٢	٢١,٣	٢١,٤	٧٢
٢٠٢١-١٢-٢١ ٠٠:٠٠:٠٠	٢٢,٦	٢٢,٣	٢٢,٣	٧٤
٢٠٢١-١٢-٢٢ ٠٠:٠٠:٠٠	٢٢,٤	٢١,٦	٢٢,١	٧١
٢٠٢١-١٢-٢٣ ٠٠:٠٠:٠٠	٢٤,٣	٢٣,٨	٢٣,٩	٥١
٢٠٢١-١٢-٢٤ ٠٠:٠٠:٠٠	٢٣,٥	٢٣,٣	٢٣,٤	٧١
٢٠٢١-١٢-٢٥ ٠٠:٠٠:٠٠	٢٣	٢٢,٣	٢٢,٤	٦٩
٢٠٢١-١٢-٢٦ ٠٠:٠٠:٠٠	٢٣,٦	٢٢,٥	٢٢,٥	٦٠
٢٠٢١-١٢-٢٧ ٠٠:٠٠:٠٠	٢٤,٢	٢٤	٢٤	٧٧
٢٠٢١-١٢-٢٨ ٠٠:٠٠:٠٠	٢٣,٧	٢٣,٥	٢٣,٥	٧٦
٢٠٢١-١٢-٢٩ ٠٠:٠٠:٠٠	٢٤	٢٢,٨	٢٢,٨	٧٤
٢٠٢١-١٢-٣٠ ٠٠:٠٠:٠٠	٢٣	٢٢,٨	٢٣	٧٦
٢٠٢١-١٢-٣١ ٠٠:٠٠:٠٠	٢٣,٣	٢٣	٢٣,٣	٧٩

Appendix (4) Temperature & humidity index at Qurayyat state on December .

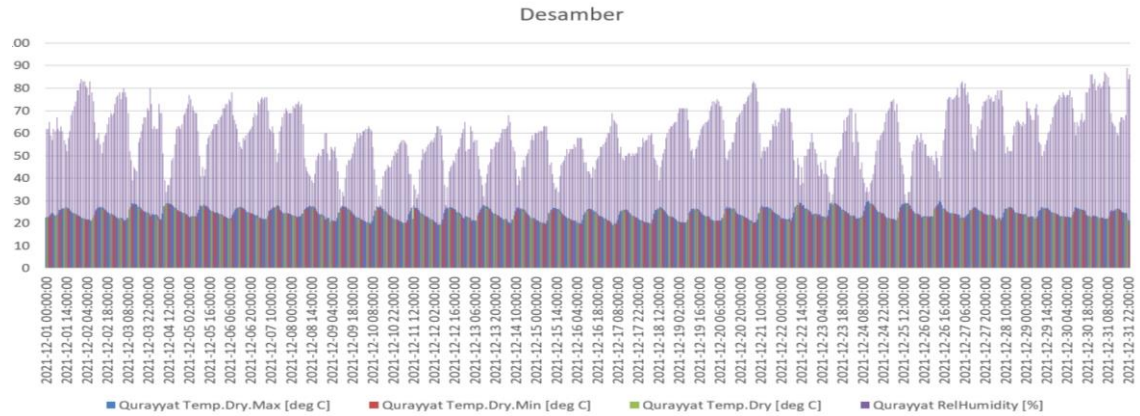


Diagram No (4)Temperature and Humidity index at Quryat state on December .

Date(TL)	Qurayyat Temp.Dry.Max [deg C]	Qurayyat Temp.Dry.Min [deg C]	Qurayyat Temp.Dry [deg C]	Qurayyat RelHumidity [%]
٢٠٢٢-٠١-٠١ ٠٠:٠٠:٠٠	٢٠,٧	٢٠,٢	٢٠,٧	٨٣
٢٠٢٢-٠١-٠٢ ٠٠:٠٠:٠٠	٢١,٨	٢١,٢	٢١,٢	٨٧
٢٠٢٢-٠١-٠٣ ٠٠:٠٠:٠٠	٢٤,٢	٢٣,٧	٢٣,٨	٦٤
٢٠٢٢-٠١-٠٤ ٠٠:٠٠:٠٠	٢٤,٢	٢٣,٩	٢٤,١	٧١
٢٠٢٢-٠١-٠٥ ٠٠:٠٠:٠٠	٢٠,٣	٢٠,١	٢٠,١	٨٤
٢٠٢٢-٠١-٠٦ ٠٠:٠٠:٠٠	٢١	٢٠,٦	٢٠,٦	٦١
٢٠٢٢-٠١-٠٧ ٠٠:٠٠:٠٠	٢١,٥	٢١,٣	٢١,٤	٤٦
٢٠٢٢-٠١-٠٨ ٠٠:٠٠:٠٠	١٩	١٧,٧	١٧,٧	٤٥
٢٠٢٢-٠١-٠٩ ٠٠:٠٠:٠٠	١٩,٤	١٨,٨	١٨,٨	٥٩
٢٠٢٢-٠١-١٠ ٠٠:٠٠:٠٠	٢٠,٤	٢٠,٣	٢٠,٣	٦٥
٢٠٢٢-٠١-١١ ٠٠:٠٠:٠٠	٢٠,١	١٨,٨	١٩,٧	٥٩
٢٠٢٢-٠١-١٢ ٠٠:٠٠:٠٠	٢٠	١٩,٧	١٩,٩	٥٩
٢٠٢٢-٠١-١٣ ٠٠:٠٠:٠٠	٢٠	١٩,٢	١٩,٢	٦٩
٢٠٢٢-٠١-١٤ ٠٠:٠٠:٠٠	٢٠,٦	٢٠,٢	٢٠,٢	٦١
٢٠٢٢-٠١-١٥ ٠٠:٠٠:٠٠	٢١,٤	٢٠,٨	٢٠,٩	٦٣
٢٠٢٢-٠١-١٦ ٠٠:٠٠:٠٠	٢٢,٧	٢١,٧	٢١,٨	٥٦
٢٠٢٢-٠١-١٧ ٠٠:٠٠:٠٠	٢٣	٢٢,٦	٢٢,٧	٦٧
٢٠٢٢-٠١-١٨ ٠٠:٠٠:٠٠	٢٣,٣	٢٢,٨	٢٢,٨	٨١
٢٠٢٢-٠١-١٩ ٠٠:٠٠:٠٠	٢٣,٦	٢٣,٤	٢٣,٥	٨٠
٢٠٢٢-٠١-٢٠ ٠٠:٠٠:٠٠	٢٣,٥	٢٣,٣	٢٣,٤	٨١
٢٠٢٢-٠١-٢١ ٠٠:٠٠:٠٠	٢٥,٨	٢٥,٦	٢٥,٧	٤٧
٢٠٢٢-٠١-٢٢ ٠٠:٠٠:٠٠	٢١,١	٢٠,٣	٢٠,٣	٣٩
٢٠٢٢-٠١-٢٣ ٠٠:٠٠:٠٠	١٨,٥	١٨,٢	١٨,٢	٤٩
٢٠٢٢-٠١-٢٤ ٠٠:٠٠:٠٠	٢٠,٣	١٩,٧	١٩,٧	٥٠
٢٠٢٢-٠١-٢٥ ٠٠:٠٠:٠٠	١٩,٧	١٩,١	١٩,١	٦٧
٢٠٢٢-٠١-٢٦ ٠٠:٠٠:٠٠	٢١,٢	٢٠,٣	٢٠,٣	٦٧
٢٠٢٢-٠١-٢٧ ٠٠:٠٠:٠٠	٢٠,٢	١٩,٧	١٩,٨	٥٩
٢٠٢٢-٠١-٢٨ ٠٠:٠٠:٠٠	٢٠,٥	١٩,٥	١٩,٧	٦٦
٢٠٢٢-٠١-٢٩ ٠٠:٠٠:٠٠	٢١,٧	٢٠,٩	٢١	٥٨
٢٠٢٢-٠١-٣٠ ٠٠:٠٠:٠٠	٢٢,٢	٢٠,٧	٢١,١	٧٠
٢٠٢٢-٠١-٣١ ٠٠:٠٠:٠٠	٢٢,٦	٢٢,٣	٢٢,٣	٧٤

Appendix (5) Temperature & humidity index at Qurayyat state on January.

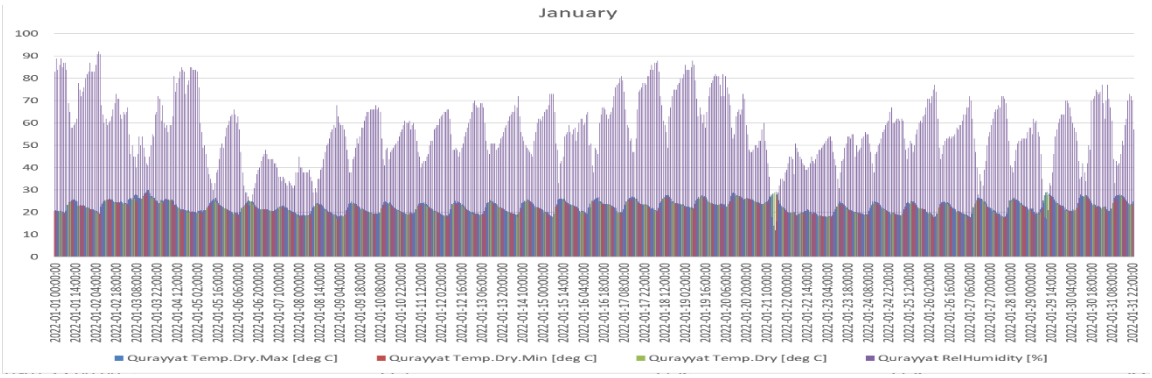


Diagram No (5) Temperature and Humidity index at Quryat state on January.

Date (TL)	Qurayyat Temp.Dry.Max [deg C]	Qurayyat Temp.Dry.Min [deg C]	Qurayyat Temp.Dry [deg C]	Qurayyat RelHumidity [%]
٢٠٢٢-٠٢-٠١ ٠٠:٠٠:٠٠	٢٤,٩	٢٤,٢	٢٤,٧	٥١
٢٠٢٢-٠٢-٠٢ ٠٠:٠٠:٠٠	٢٣,١	٢٢,٧	٢٢,٧	٧٣
٢٠٢٢-٠٢-٠٣ ٠٠:٠٠:٠٠	٢٥,١	٢٤,٢	٢٤,٢	٢٨
٢٠٢٢-٠٢-٠٤ ٠٠:٠٠:٠٠	٢٠,٦	٢٠,١	٢٠,٣	٤٤
٢٠٢٢-٠٢-٠٥ ٠٠:٠٠:٠٠	٢١,٤	٢٠,٦	٢٠,٩	٦٤
٢٠٢٢-٠٢-٠٦ ٠٠:٠٠:٠٠	٢٣,٧	٢٢,٦	٢٢,٦	٤٢
٢٠٢٢-٠٢-٠٧ ٠٠:٠٠:٠٠	٢٣,٥	٢٣,٢	٢٣,٥	٥٤
٢٠٢٢-٠٢-٠٨ ٠٠:٠٠:٠٠	٢١,٦	٢١,٢	٢١,٣	٥١
٢٠٢٢-٠٢-٠٨ ٠١:٠٠:٠٠	٢١,٤	٢٠,٩	٢١,٢	٣٣
٢٠٢٢-٠٢-٠٩ ٠٠:٠٠:٠٠	٢٣,٣	٢٢,٨	٢٣,١	١٧
٢٠٢٢-٠٢-١٠ ٠٠:٠٠:٠٠	٢١,٦	٢٠,٧	٢٠,٨	٦٧
٢٠٢٢-٠٢-١١ ٠٠:٠٠:٠٠	٢١,٤	٢٠,٩	٢١,٢	٦٦
٢٠٢٢-٠٢-١٢ ٠٠:٠٠:٠٠	٢١,٤	٢٠,٣	٢٠,٧	٥٢
٢٠٢٢-٠٢-١٣ ٠٠:٠٠:٠٠	٢٢	٢١,١	٢١,٤	٤٩
٢٠٢٢-٠٢-١٤ ٠٠:٠٠:٠٠	٢٣	٢٢,٥	٢٢,٥	٥٨
٢٠٢٢-٠٢-١٥ ٠٠:٠٠:٠٠	٢١,٧	٢١,٢	٢١,٧	٥٨
٢٠٢٢-٠٢-١٦ ٠٠:٠٠:٠٠	٢١,٩	٢٠,٣	٢٠,٣	٧٤
٢٠٢٢-٠٢-١٧ ٠٠:٠٠:٠٠	٢٢	٢١,٣	٢١,٣	٦٩
٢٠٢٢-٠٢-١٨ ٠٠:٠٠:٠٠	٢١,٨	٢١,١	٢١,١	٦٩
٢٠٢٢-٠٢-١٩ ٠٠:٠٠:٠٠	٢٢,١	٢١,٣	٢١,٦	٦١
٢٠٢٢-٠٢-٢٠ ٠٠:٠٠:٠٠	٢٢,٢	٢١,٩	٢٢	٥٩

Appendix (6) Temperature & humidity index at Qurayyat state on February .

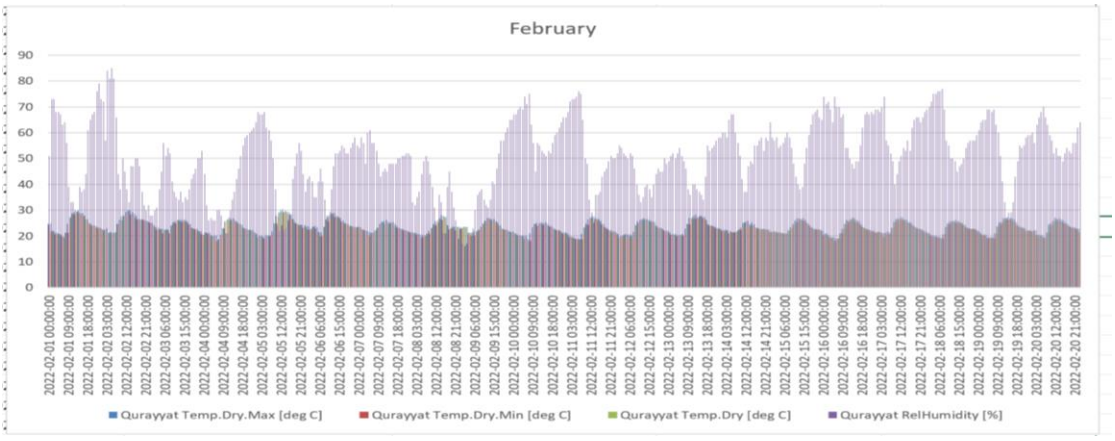


Diagram No (6) Temperature and Humidity index at Quryat state on February.

Via implementation of the atmosphere protocol air temperature & relative humidity index, we found the following results:

Date &time of measurement		Current air temperature(x)	Air maximum temperature(x)	Air minimum temperature(x)	Humidity
20\2	12:10	32.5	36.2	30.22	30%
21\2	12:10	32.2	36	32.1	68%
22\2	12:10	31.6	33.6	31.4	67%
23\2	12:12	31.7	32.7	32.7	65%
24\2	12:13	30.5	30.8	30.5	85%

Table No (2) Temperature and Humidity index of Al Jazir area .

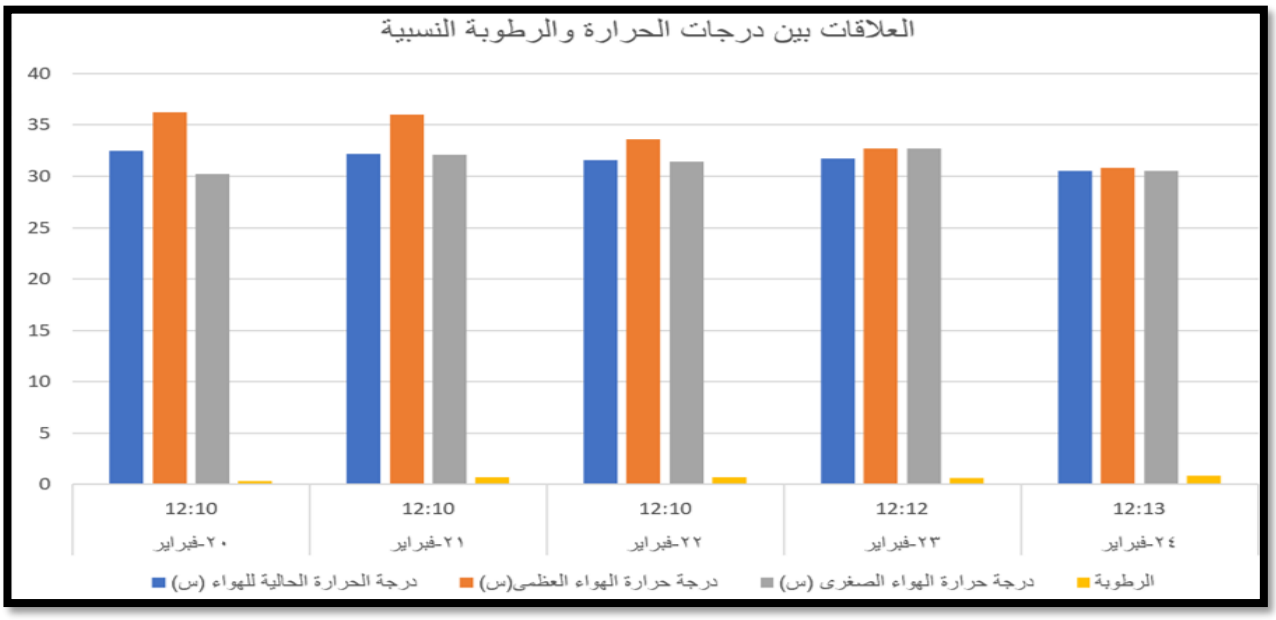


Diagram No (7) Temperature and Humidity index of Al Jazir area on February.

Month	Min .Temp.(x)	Max .Temp.(x)	Max. .humidity %	The date in which max.humidity registered
September	30	34	85%	7\9\2021
October	26.3	33.6	87%	5\10\2021
November	21.2	24.4	81%	3\11\2021
December	21.5	24.2	84%	2\12\2021
January	19.4	24.2	87%	2\1\2022
February	20.1	24.9	74%	16\2\2022

Table (3)Comparison between max. & mini. Temperature and the relative humidity during six months at Qurayyat State.

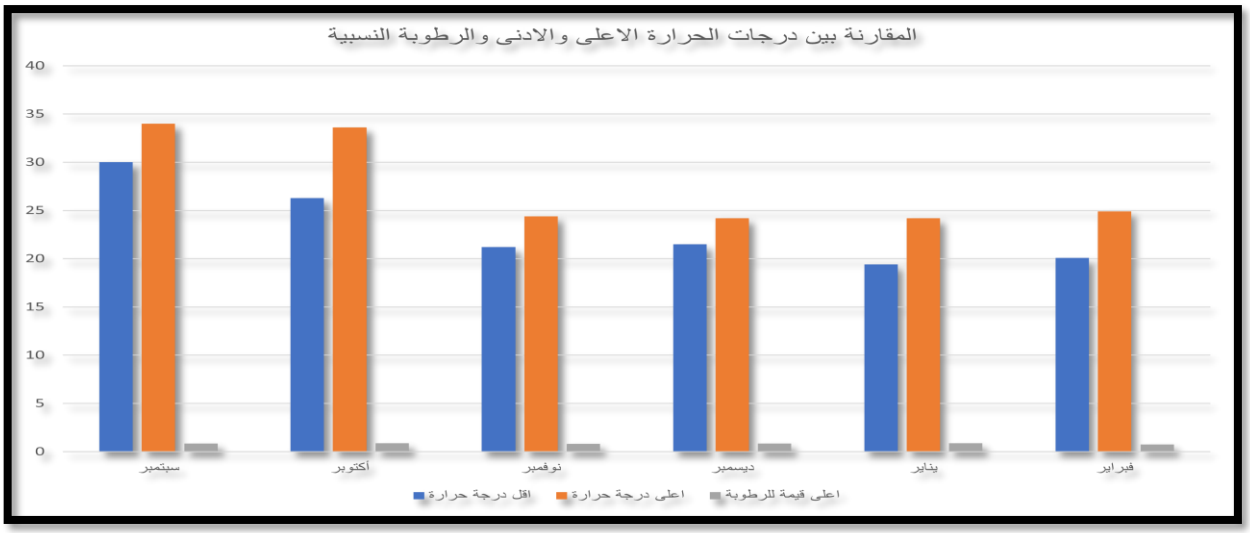


Diagram (8)Temperature and Humidity index of Qurayyat state during six months .

Register data on the site: (www.glope.com)

The data has been entered into the website program

Current temperature data:

B: Humidity data:

The Results Discussion:

Through the interview, we found that the reasons for the emergence of the palm Dubas are: farmer don't take care of the palm, the irregular cultivation, the high density of palm trees, and the effect of humidity.

Via implementing the atmospheric protocol, the results of the meteorological center, the second question was answered: It was found through the appendices (1, 2, 3, 4, 5 and 6) and the diagrams : (1, 2, 3, 4,

5 and 6): Temperatures have a major role in the spread of the insect in the month of September and October, and the humidity is high, which helped in hatching insect eggs and studies in the Journal of Insect Research confirm that the female lays eggs in May to begin the life cycle of the autumn generation, where the eggs are inserted into the tissues of young leaves or wicker tissues. The eggs continue in a state of dormancy throughout the summer, around mid-September, when the temperature drops slightly and the humidity increases in the dry areas. The eggs begin hatching and the nymphs invade the leaves and feed greedily on the plant sap that they absorb in large quantities, resulting in secretions in the form of a honeycomb substance that flows from the infected palm.

Therefore, farmers must follow the proper methods when planting trees by leaving long distances for ventilation, and reduce humidity.

Conclusion:

We thank God for completing this research, through which we learned about the causes of the spread of the palm Dubas through coordination with the Agricultural Wealth Center in Qurayyat and the implementation of the atmospheric protocol. We found that:

The reasons are (irregular cultivation, lack farms care and humidity are the most important factors of insect growth, high density between trees , dark places and the insect often spreads in old farms crowded with trees.

The high humidity that the region witnessed during the months from September to December was a very suitable environment for the breeding and spread of the insect.

It is necessary for all farms to take care of their farms, and to intensify the continuous awareness by the official authorities to educate farmers.

Sources of errors in the results of temperature, and humidity, due to the different devices used in the school, and the meteorological center.

The strengths points were: in obtaining important, influential and strong results from the meteorological center, while the weak points were the failure to give the results of the analysis of the anti-vaccine against palm dubas.

The research is applicable to the possibility of devising an effective biological control for the eradication of the palm dubas insect.

Thanks and appreciation:

Praise be to Allah , prayers and peace be upon his prophets, Mohammad, may God bless him and grant him peace.

We are pleased to extend our sincere thanks to everyone who contributed to the completion of this research:

1- Mr. Ahmed Al Balushi:

The national coordinator of the Globe Environmental Program in the Sultanate of Oman ,for all the valuable information of this research.

2- All the school's teaching staff and the school principal

For providing support and facilitating this research , especially T. Mona Al-Zadjali and T. Wafa Al-Alawia, IT teacher and glope program supervisor, and T. Sheikha Al-Maawally.

3- Honorable T. Zakia Al Magemyia , the Innovation Department , at the Ministry of Education:

Who spared no effort in communicating all that is new in science and knowledge regarding the research.

4- Honorable Mr. Mahmoud Al-Khiari (Head of the Special Forecasting Department)

Who provided us with valuable information by sending a table of temperatures and humidity at the Qurayyat monitoring station during the months from September to February.

5- Agricultural Development Center in Qurayyat state

We thank Eng. Yahya Al Darmaki and Eng. Zahra Al Hadidiya for their cooperation in providing us with scientific information.

6- The General Directorate of Agricultural Wealth, Fisheries and Water Resources in the Governorate of Muscat; For their cooperation with us to examine samples of the Palm Dubas Insect Vaccine.

Badge Selection

Highly esteemed scientists were contacted through an interview with

Engineer Yahya Al Darmaki and Engineer Zahraa Al Hadidiya, to identify the most important reasons for the spread of palm Dubas.

We also communicated with the Director of the Special Meteorological Center to provide us with temperatures and humidity index during the six months from September 2021 to February 2022

We discovoered anti-DUbas vaccine , and coordination was made with Engineer Yahya Al Darmaki to send a sample of the vaccine to the laboratory of the Research Center at the General Directorate of Agriculture and Water Resources in Muscat.

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2. Al Abbasi. (1988). Biology of palm dubas, Under laboratory conditions, Ommatissus binotatus , Palm Magazine.

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7 - Information was collected from Web (Internet) on (November 2021-February 2022) https://en.wikipedia.org/wiki.