

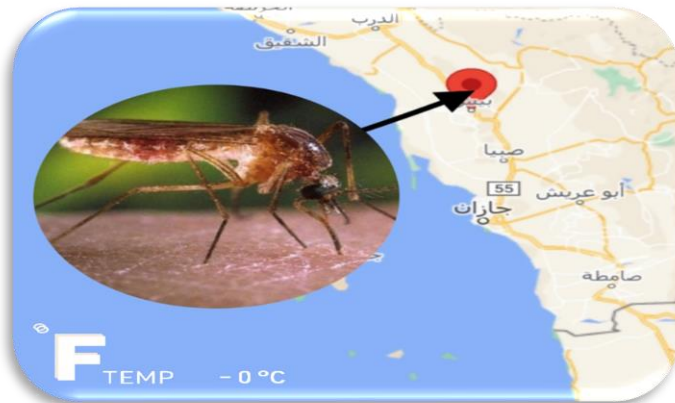


Saudi Arabia

Ministry of Education / Sabya

search title

The relationship between weather change and mosquito breeding and its impact on human health in the city of Bish.



Students names/

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Date / 2024 AD

Abstract:

This study aims to know the relationship between weather change and mosquito breeding and its impact on human health in the city of Bish, and by going out for a walk to the garden of the city of Bish on a rainy day, we noticed a large gathering of mosquitoes, as the residents of the region suffer from the spread of diseases caused by mosquitoes, and from here we began to suggest the following :

Research questions and hypotheses:

- Is there a relationship between weather change and mosquitoes breeding?
- Is there an effect of mosquitoes on human health in the city of Bish?

Hypothesis:

- There is a relationship between weather change and mosquito breeding.
- There is an effect of mosquitoes on human health in the city of Bish.

procedures:

We used (mixed methods) observation, experiment, interview, and descriptive survey method. A questionnaire was distributed to a random sample, and measurements were made using Globe tools and data visualization.

Results:

There is a relationship between weather change and mosquito breeding that affects human health in the city of Bish.

Conclusions:

There is a direct relationship between weather change and mosquito breeding, as rain and heat are among the most important factors that help breed mosquitoes.

There is an effect of mosquitoes on human health in the city of Bish, as it is a vector of diseases.

Recommendations:

- Conducting more studies and advanced experiments on mosquitoes, their danger, their relationship to weather, their impact on human health, and how to limit their reproduction, and getting rid of mosquitoes, its repellent scent, its beloved herbal plants, and natural environmentally friendly oils.

key words :

Weather: The state of the atmosphere in its various phenomena such as temperature, pressure, humidity, and winds in a specific place and for a short time

Mosquitoes: Several genera of harmful small insects.

Rain: It is a form of water droplets falling from clouds in the sky.

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Abstract :

This study aims to know the relationship between weather change and mosquito breeding and its impact on human health in the city of Bish, and by going out for a walk to the garden of the city of Bish on a rainy day, we noticed a large gathering of mosquitoes as the residents of the region suffer from the spread of diseases caused by it, and from here we began to suggest what The following: **research questions and hypotheses:**

- Is there a relationship between weather change and mosquito breeding?
- Is there an effect of mosquitoes on human health in the city of Bish?

Hypothesis:

- There is a relationship between weather change and mosquito breeding.
- There is an effect of mosquitoes on human health in the city of Bish.

Variables:

Independent: weather.

Affiliate: Mosquitoes.

research aims:

- Identifying the relationship between weather change and mosquito breeding and its impact on human health.
- Determine the damage caused by mosquitoes and how to prevent them.
Identifying the favorable conditions for mosquito gathering.

research importance :

Contribute to knowing the relationship between weather change and mosquito breeding and its impact on human health in the city of Bish.
It helps to know ways to prevent the danger of mosquitoes.

search limits :

Objective: The relationship between weather change and mosquito breeding and its impact on human health in the city of Bish.

Time: 2022- 2024 AD.

Location: Sabya / Bish city.

search terms:

Mosquitoes: several species of small, harmful insects, from the family of mosquitoes of the order Diptera, the females of which feed on human blood and transmit several diseases to him, and the males feed on the nectar of flowers.

Weather: The state of the atmosphere in its various phenomena such as temperature, pressure, humidity, and winds in a specific place and for a short time.

Rain: It is a form of water droplets falling from clouds in the sky.

Introduction :

Mosquitoes are among the deadliest organisms in the world. It transmits diseases that cause millions of deaths every year. The city of Bish faces the problem of mosquito breeding, which is the annoying insect that affects human health greatly as it causes many epidemic and infectious diseases such as malaria and dengue fever, which lead to death. Based on this matter, we tried to find the relationship between Weather change and mosquito breeding and its impact on human health in the city of Bish, how to prevent mosquitoes and solutions that help reduce their breeding and limit their risk.

Previous studies :

Al-Bayuk study, (1982 AD) under the title: Geography of Diseases in the Kingdom of Saudi Arabia which discussed the natural factors and their impact on the spread of diseases such as malaria, schistosomiasis, trachoma and cholera . The factors affecting them were divided into organic and inorganic factor. Then, we discussed the human factors that are related to health.

In a study in (2021) at the virtual Globe exhibition for the second secondary school in Makkah, entitled

(Studying the extent of mosquito breeding and the factors affecting it in Makkah Al-Mukarramah), which aims to know how to get rid of mosquitoes and prevent diseases.

Based on previous studies, we conducted a similar study and it helps to improve the hypothesis which states that there is a relationship between

weather change and mosquitoes breeding and its impact on human health in Baish city .

Materials and Method (Procedures):

Tools :

- GLOBE devices (GPS - thermometer - hygrometer - pen - paper - computer - barometer - cloud chart - rain gauge - A bowl of water) Globe Environmental website.

- Resolution.

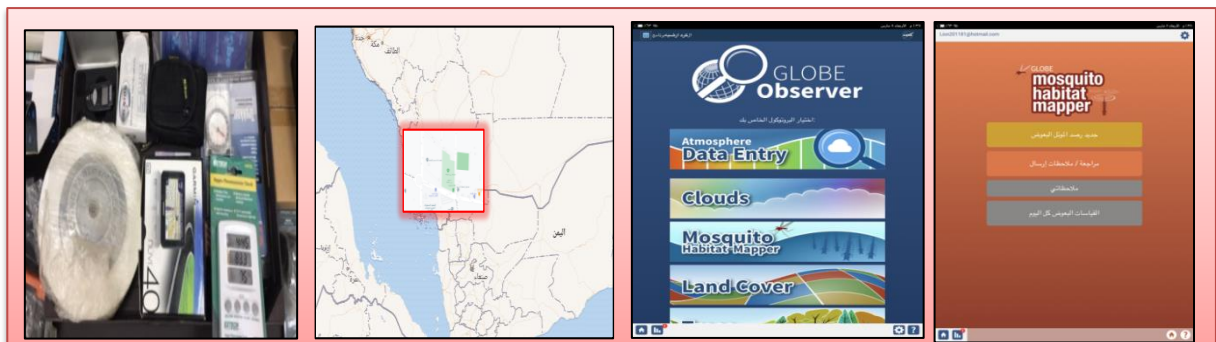
A - Preparation of the study tool: The research questionnaire was built, and in its final form it consisted of (8) paragraphs, and the questionnaire was distributed to a random sample.

B - The validity of the research tool: the researchers presented the questionnaire to a random sample to express their opinion on this test in terms of: its relevance to the research topic, its comprehensiveness, and the sufficiency of the number of elements to enrich the research. And its approval, and it became in its final form.

C- Stability of the research tool: The stability of the research tool (resolution) was confirmed, and high rates of stability were observed for all areas of the resolution.

Steps: We used (mixed methods) observation, experiment, interview and descriptive survey method

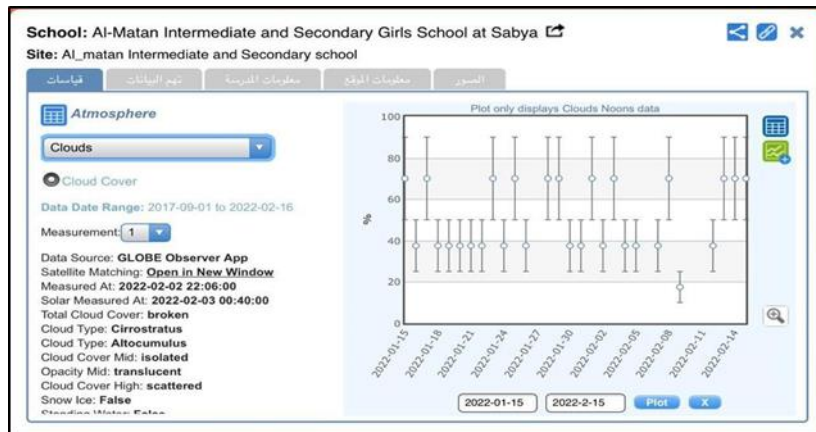
- We used the GLOBE website and devices to take the data and determine the location. (Figure 1) and visualize the temperature data and the formation of clouds at the Al-Matan school site (Figure 2 and 3).



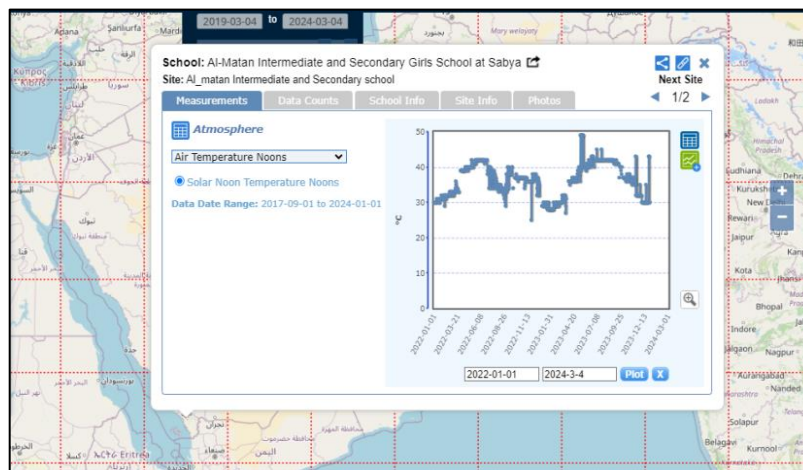
Tools used and positioning (Fig. 1)

A graph (Fig. 2) showing the visualization of the clouds data in Al-Matan School for a month

From 1/15/2022 - 2/15/2022.



A graph (Fig. 3) showing temperature data for two years from the Globe website of Al-Matan School.

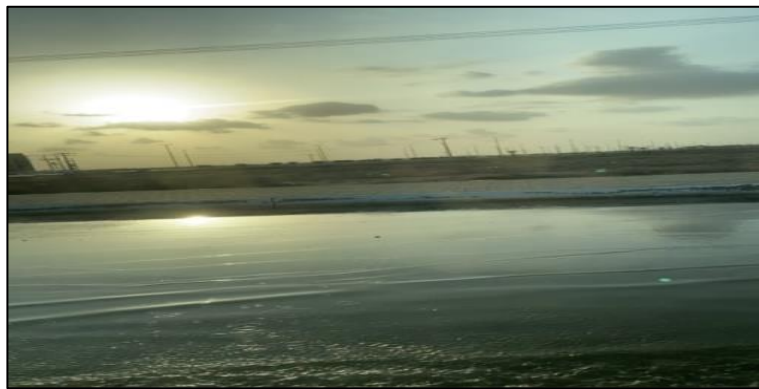


- **Then we used the observation:** that at the time of rain and low temperature in our village of Al-Matan, which is located in Baish city , we notice an increase in the spread of mosquitoes and the days of seasonal dust in the month of July. The mosquitoes disappear and one day while we are going out to a park in Baish city, which is located at a latitude (17) to the north and longitude (42) to the east, on February 11, 2022 AD. It was a rainy day when we noticed a large gathering of mosquitoes, and in the evening we

noticed that it increased so much that we were worried about its bites. (Fig. 4)

-One day, we went out to collect data, and a gathering of mosquito habitats was observed in a pool outside the house after the rain fell (Fig. 5), and when we passed a basin, we noticed a gathering of mosquito habitats (Fig. 6).

· And when we went out one day to Wadi Bish after it rained and torrents flowed on December 22, 2022 (Fig. 7), we noticed a gathering of water and a large number of mosquitoes.



Pictures of Baish Garden showing rainwater and mosquitoes gathering (Fig. 4)



A picture showing the gathering of mosquito habitats in a pond outside the house (Fig. 5)



A picture showing the gathering of mosquito habitats in a basin (Fig. 6).



A picture showing a mosquito gathering site in Wadi Bish after rain and torrential rains on December 22, 2022 (Fig. 7)

Then the researcher carried out an experiment in a dark room at home, so we put water inside a platinum container and set it up By simulating external weather changes, sometimes by lowering the room temperature and sometimes by raising it, and we left it for a week, we found that mosquitoes multiplied and their larvae appeared in abundance during that period, as in Figure (8).



**A picture showing mosquito larvae gathering in a bowl of platinum in a dark room
(Fig. 8)**

Then we conducted an interview with one of the infection control employees at Sabya General Hospital, Dr. Abdo Attin, and we asked him a number of questions, and he answered them as follows:

1/ The weather is a vital and important factor in the reproduction of mosquitoes, so does the temperature changes throughout the year have a clear effect on their reproduction?

High and low temperatures play a major role in reducing the reproduction of mosquitoes and their adaptation to temperatures

2/ How many patients are infected with diseases caused by mosquitoes?

There is no specific percentage, and this is due to the season of the spread of mosquitoes and the infection that they cause, and control, as well as the percentage of infection among the community, and the percentage of infection varies from year to year at unstable rates.

3/ What diseases are caused by mosquitoes?

There are two types of disease-causing mosquitoes

The first type: Anopheles mosquitoes that cause malaria

The second type: Aedes, which causes viral hemorrhagic fevers such as dengue fever, and each of them has its own conditions and nature of life.

4/ What is the breeding season for mosquitoes, which is considered the most prominent and spread during which is malaria and dengue fever?

The season of mosquito breeding and the spread of malaria coincides with the rainy season, swamps and condensed water. It helps to multiply mosquitoes. The disease can be transmitted at any time throughout the year when there are infected cases. Either Mosquitoes that transmit dengue fever are found in homes and breed in the water of air conditioners and open tanks refrigerators.

5/ What age group is considered the most vulnerable to malaria and diseases caused by mosquitoes?

All age groups are susceptible to infection, because mosquitoes feed on human blood, and the disease can be transmitted to any age group.

6/ Recommendations to help us reduce the risk of diseases caused by mosquitoes?

First, prevention is better than cure:

- Air conditioners must be drained in homes, and basins or containers should not be placed under the air conditioners.
- The water of planting ponds for ornamental trees must be changed inside the house.
- Covering exposed tanks.

Maintaining windows and installing nets to prevent mosquitoes from entering the house.

- Use mosquito repellent creams when hiking or when we are outside the house.

Then we used the questionnaire:

Show results: Statistical methods:

To achieve the objectives of the research and analyze the collected data, the arithmetic mean was used to find out trends research sample responses

Ratios and frequencies: Among the initial steps in preparing scientific research from the research sample, they chose a random study randomly (70) from the study population and a random sample (50) was taken from it, representing (80%)

From the table and the statistical drawing, we note the percentage of the degree of approval in the questionnaire study tool

Table No. (1)

	paragraphs	descent				SMA	Total
		Strongly Agree	Agree	Neutral	Disagree		
1	There is a relationship between changing weather and mosquito breeding	68%	28%	4%	0%	80%	100%
		High	Medium	Weak	None		
		60%	26%	12%	2%		
High	Medium	Weak	None				
3	Temperature is related to mosquito breeding	42%	32%	18%	8%	80%	100%
		Medium	Medium	Weak	Weak		
4	Mosquito breeding increases in the winter and decreases in the summer	52%	24%	10%	14%	80%	100%
		High	Medium	Weak	Weak		
5	Mosquitoes pose a threat to human health and the spread of diseases	84%	12%	2%	2%	80%	100%
		High	Weak	Weak	Weak		
6	Stagnant water, swamps and ponds are factors that help mosquitoes breed	82%	16%	2%	0%	80%	100%
		High	Weak	Weak	None		
7	Mosquitoes have specific breeding sites	60%	24%	14%	0%	80%	100%
		High	Medium	Weak	None		

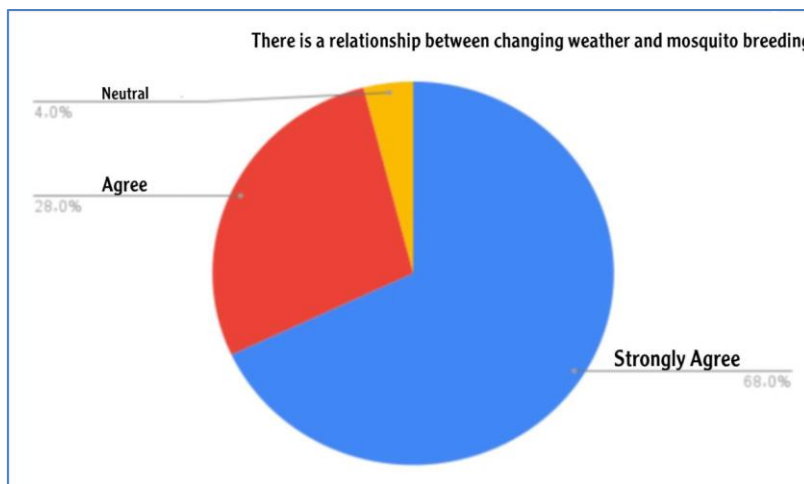
8	Mosquitoes thrive at night and in dark places	70%	18%	6%	6%	80%	100%
		High	Weak	Weak	Weak		

Discussion and explanation of the reasons:

Results related to the study questions and their discussion as shown through graphic forms:

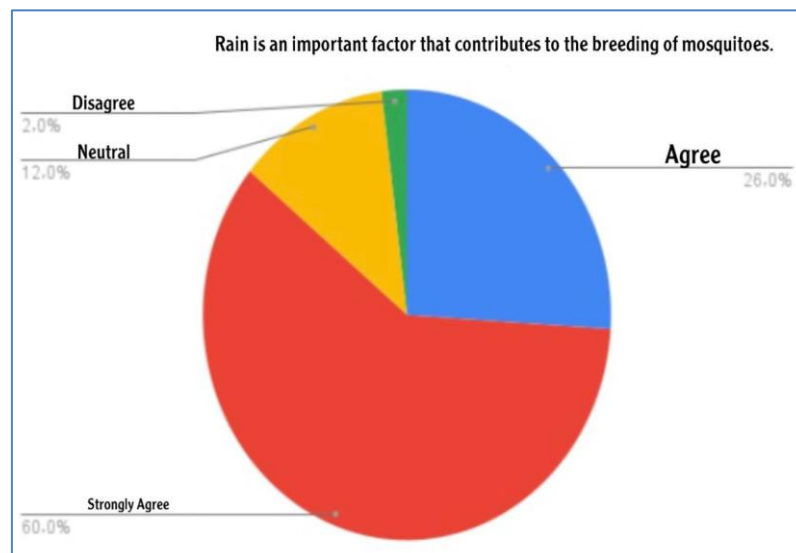
Percentage of answers and opinions of the first paragraph: There is a relationship between weather change and mosquito breeding

Diagram No. (1)



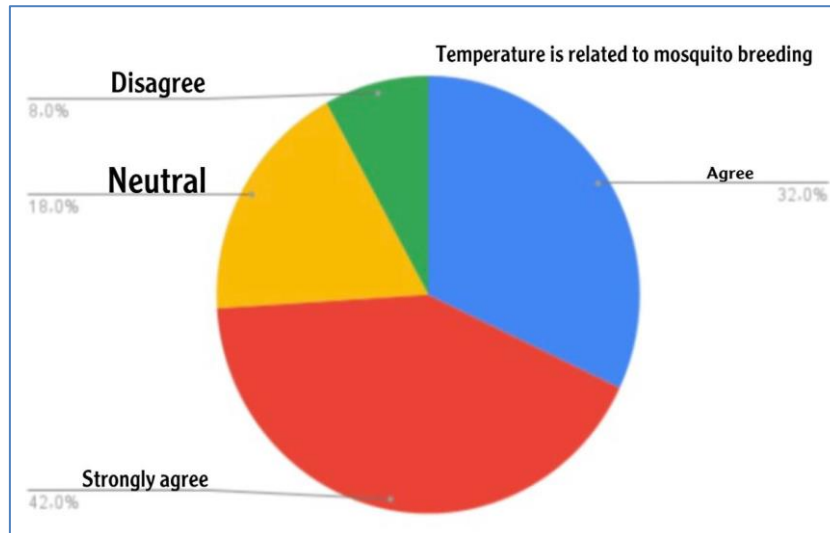
Percentage of answers and opinions of the second paragraph : Rain is an important factor that helps mosquitoes breed?

Diagram No. (2)



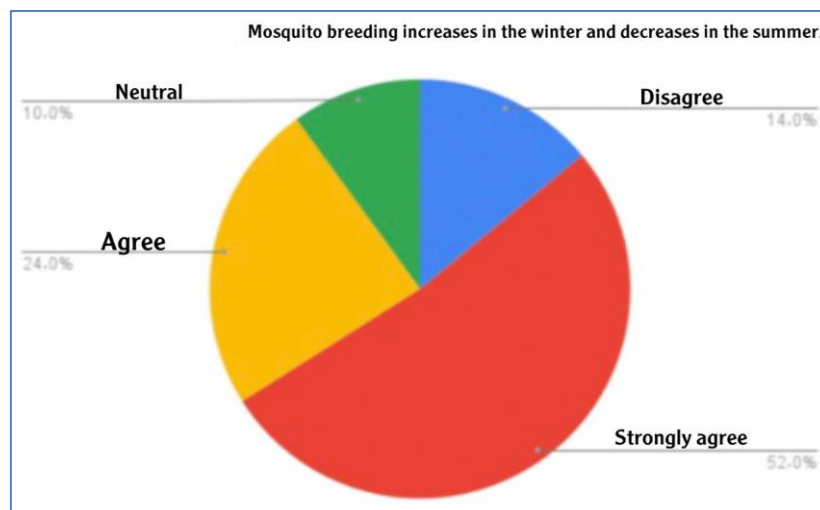
Percentage of answers and opinions of the third paragraph: Temperature is related to mosquito breeding?

Diagram No. (3)



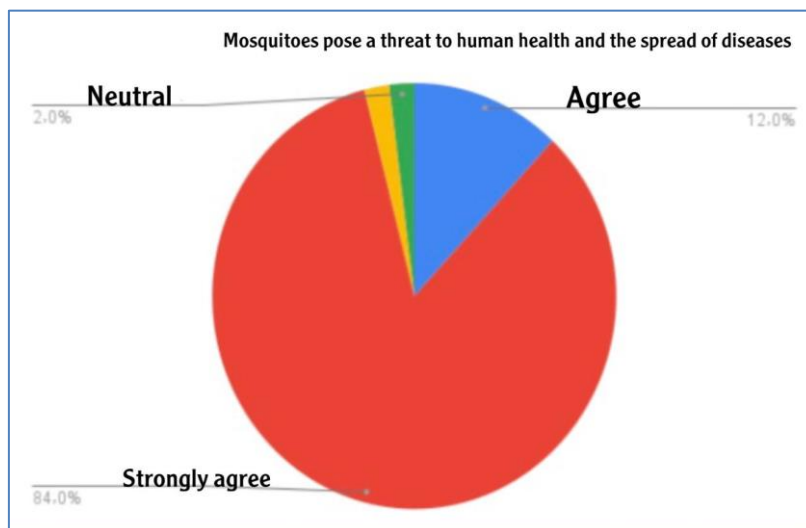
Percentage of answers and opinions of the fourth paragraph: Mosquito breeding increases in the winter and decreases in the summer?

Diagram No. (4)



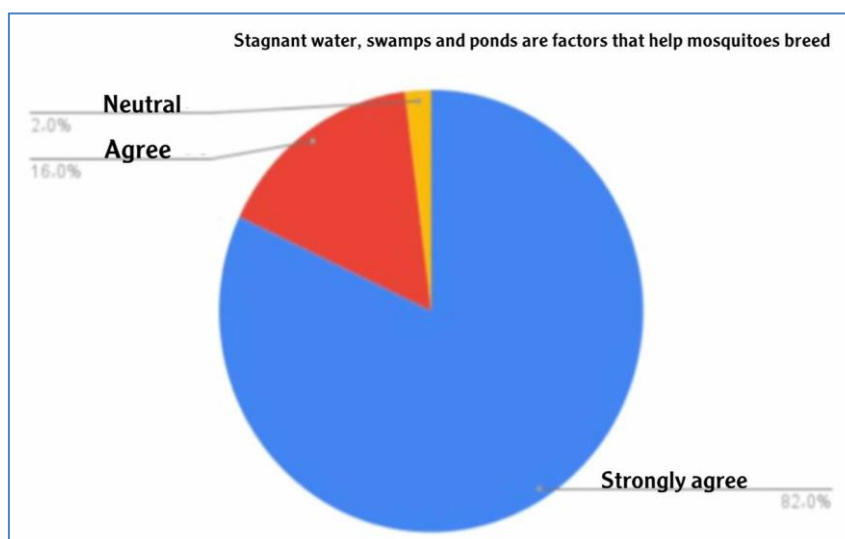
Percentage of answers and opinions for the fifth paragraph: Mosquitoes pose a threat to human health and the spread of diseases?

Diagram No. (5)



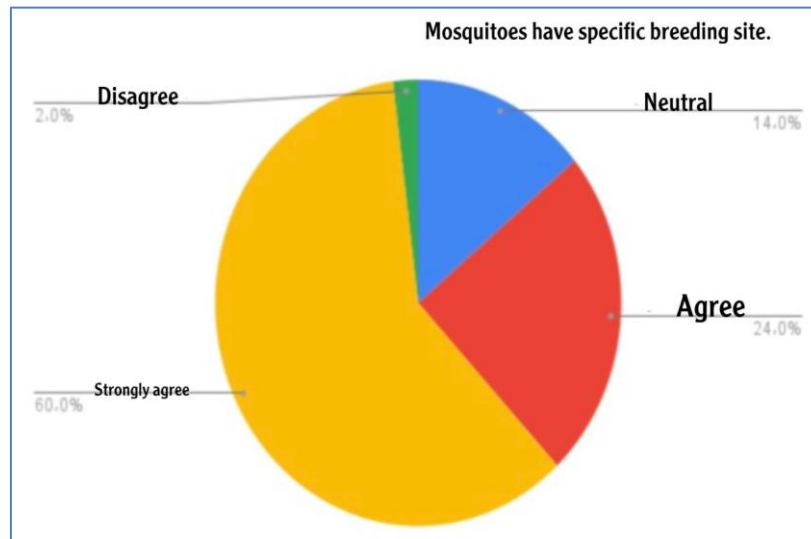
The percentage of answers and opinions of the sixth paragraph: Stagnant water, swamps and ponds are factors that help mosquito breeding?

Diagram No. (6)



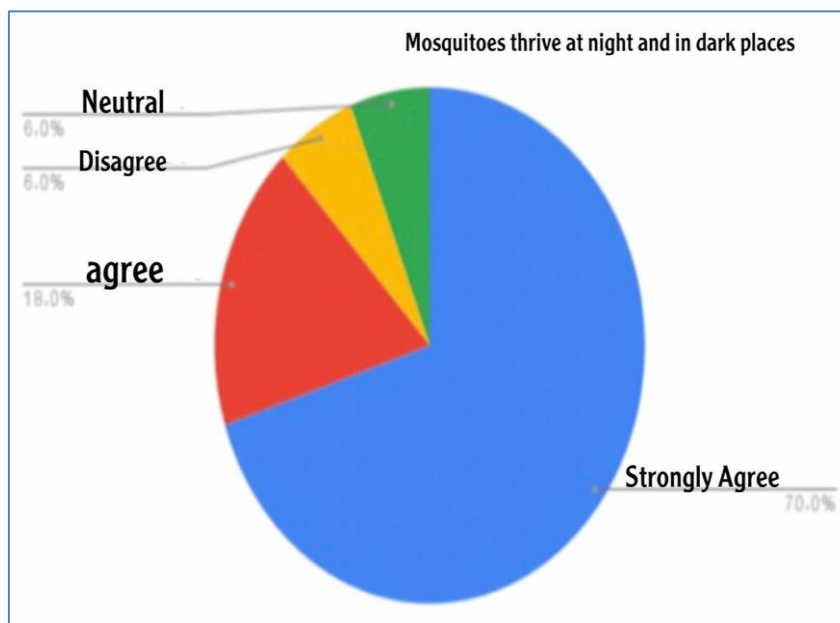
The percentage of answers and opinions of the seventh paragraph:
Mosquitoes have specific sites to breed in?

Diagram No. (7)



Percentage of answers and opinions for the eighth paragraph: Mosquitoes multiply at night and in dark places?

Diagram No. (8)



The results during the statistical analysis highlighted some important issues:

_ We found that the percentage of support in the opinions that there is a relationship between weather change and mosquito breeding, where the agreement was strongly estimated at 68%, and the disagreement was non-existent.

There are compatible percentages in the answer with strong agreement showing that rain is an important factor that helps mosquito breeding, estimated at 60%.

And the percentage of support appeared in the opinions that the temperature is related to the reproduction of mosquitoes and was estimated at 42%, and their reproduction increases in the winter and decreases in the summer.

And the percentage of approval in the items of the fifth and sixth paragraphs was between the answer (strongly agree - I agree) was between high and medium, and the percentage of disapproval was very weak.

Where the percentage of approval appeared strongly that mosquitoes pose a danger to humans and greatly contribute to the increase of diseases, and it was estimated at 84%.

And that stagnant water, swamps and ponds are among the factors that help the breeding of mosquitoes, estimated at 82%, and that

Mosquitoes have specific sites to breed in, especially at night and dark places.

The analysis data showed that there is a relationship between weather and mosquito breeding and its impact on human health in the city of Bish.

- Based on the visualization of temperature and cloud data in the village of Al-Matan, which is located near the city of Bish (Fig. 2, 3), the observations and photos that were taken (Fig. 4-5-6-7), and the experiment (Fig. 8), it becomes clear to us that the weather The city of Bish is variable and varies from one period to another in terms of temperature, cloud formation, precipitation, and the change in weather varies from season to season. In

summer, dust blows and the temperature rises, and in winter, the temperature decreases. All of this has a significant impact on the reproduction of mosquitoes and the spread of diseases caused by them.

- Based on the interview we conducted with an infection control employee at Sabya General Hospital, Dr. Abdo Atein, it became clear that there is a direct relationship between the rise and fall of temperature and the reproduction of mosquitoes coinciding with the rainy season, so the infection cases increase accordingly.

The percentage of patients infected with mosquito diseases and the spread of infection varies regardless of the affected age groups.

Conclusions:

In this study, we found a direct relationship between weather change and mosquito breeding, and thus affects human health, which the residents of the city of Bish in particular suffer from, and the world population in general, as it is a carrier of diseases such as malaria and infectious and dangerous diseases that lead to death.

Through experience, observations, interview and questionnaire results, we concluded that the most important factor causing the spread of mosquito diseases is weather change.

This study helps to develop solutions and emphasizes the importance of studies and research to obtain solutions and results that help reduce the danger of mosquitoes.

Discussion :

There are many studies that prove the relationship of weather with mosquito breeding in agreement with our current study, but the purpose of this study is to find appropriate solutions that help solve this problem in the city of Bish and reduce the risk of diseases caused by mosquitoes and in the light of what we have reached in this current research From the conclusions, the following recommendations can be made:

- Conducting more studies and advanced experiments on mosquitoes, their danger, their relationship to weather, their impact on human health, and how to limit their reproduction.
- Establishing centers for scientific research and monitoring environmental problems by the Ministry of Health and the Ministry of Environment.
- You can get rid of mosquito, by planting natural perfumed herbs as they make the mosquito stay away from their smell, and some of those herbs are like (basil, rosemary, thyme, lavender.) making from them repellent insects spray and spray at the places where animals are being kept (as farms) and the places where trees and grass are, and to get rid of: water puddles, swamps wastes, and the water puddles that are after rains.
- preserve the natural places by keeping them clean and prevent them from corrupting, prevent the places where mosquito love to stay in by using natural oils: such as (cinnamon oil, lemon oil, thyme oil)
- Reducing going out of the house in the evening, because mosquitoes spread more in the dark, especially gardens.

Difficulties:

- Unavailability of previous measurements of mosquitoes for the study site in the Globe program.
- The danger of mosquitoes, which led to the difficulty of conducting experiments on swamps and places where they congregate.

Acknowledgments:

Thank you to our family who pushed us forward, to my country, and Globe's environmental teacher, Faizah Ibrahim Bahri, a geography teacher, for helping us and training us on the right way to prepare the research, and Ms. Faika Mognie , an English teacher for translating the research, and Ms. Awali Attia, a science teacher, specializing in biology. Special thanks to teacher Amal Mahdi, who helped and encouraged us, and we were drawing positive energy from her. A special thanks to: dr.Abadi Muhammed Mushlawi,assistant professor in the insects' science,of Jazan university, and dr.Osamah Muhammed Abo Al. Gait assistant professor in the insects' science of Jazan university. We thank her from our heart for her helping in completing this research, and Globe teacher Aida Al-Rashidi from Nawan School in Al-Makhwah, and teacher Homaa Hattan from Third Secondary School in Baish. The infection control officer, Dr. Abdo Attin in answering the interview questions. They were asked some information about Globe, the Ministry of Health for diseases caused by mosquitoes, the Ministry of Water and Environment, our school that gave us support, and the Globe program for giving us supplies.

Badges:

1- Collaborator:The research has been prepared in a participatory manner in all its procedures and stages. Also, we cooperated with Ms. Faizah Ibrahim Bahri, specializing in geography to train us on the method of preparing the research , and Mrs. Faikah Mognie an English teacher to translate the research, the science teacher, Ms. Awali Attia, is specializing in biology. In addition , we cooperated with Ms. Najla Khawaji, the supervisor of scientific activity in the Sabya Education Department . The cooperation between the students / Rital Ghaleb - Sulaf Bahri in translating the research into English, Writing research items, making a questionnaire , distributing it , Observation and data collection.

2- Communication between schools: Contacting the teacher Aida Al-Rashidi from Nawan School in Al-Makhwah and the teacher Homaa Hattan from the third secondary school in Baish, where they were asked about some information about Globe.- Makkah Al-Mukarramah School to review their previous studies on mosquitoes.

3- Community Impact: The research in brief studies for a real problem suffered by the local community, in trying to answer the questions to reach to specific results to lead to actual solutions . This is what we recommended at the end of this research and we aspire to. To be able to disseminate the proposed solutions and results throughout society and then globally in general to all countries living in the same geographical conditions.

4- STEM (Science, Technology, Engineering, and Mathematics Specialists):

In this research, cooperation with Teacher and Trainer Faizah Bahry Bachelor's degree specializing in geography for training in the method of preparing research, teacher of Computer Science at the school Fawzia Al-Zahrani to supervise the research, as well as a science teacher Awali Attia, specializing in biology, and teacher Faika Mognie, an English teacher for translating the research, as well as the teacher of mathematics, Amal Mahdi to provide advice and answer various questions. dr.Abadi Muhammed Mushlawi,assistant professor in the insects' science,of Jazan university, and dr.Osamah Muhammed Abo Al. Gait assistant professor in the insects' science of Jazan university.The infection control officer, Dr. Abdo Attin in answering the interview questions.

5- Storytellers in science , technology, engineering and mathematics :

We shared our experience with many of our colleagues at the school level . In addition, to making a questionnaire and publishing it on social media to reach the largest possible segment of society to know their opinions, and the interview with an infection control employee at Sabya General Hospital, Dr. Abdo Attin.

6- Data Scientist : To answer the research questions, we relied entirely on the data we collected, analyzed it, compared it, then extracted conclusions from it . Finally, come up with results that can be generalized, as well as developing the future and recommendations.

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