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REINTERPRETATION OF VERSES ABOUT PLANT POLLINATION AND ITS RELEVANCE TO BOTANICAL SCIENCE

THESIS

Submitted as Partial Fulfillment Requirements for Getting the Bachelor Degree of
Religious Studies (S.Ag) in Qur'an and Exegesis Sciences Department



Arranged by:

Dwi Angraini
12030223816

Supervisor I

Dr. H. Khairunnas Jamal, S. Ag, M.A.

Supervisor II

Drs. Saifullah, M. Us

**FACULTY OF USHULUDDIN
STATE ISLAMIC UNIVERSITY OF
SULTAN SYARIF KASIM RIAU
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PENGESAHAN

Skripsi yang berjudul: Reinterpretation Of Verses About Pollination And Its Relevance To Botanical Science

Nama : Dwi Angraini

NIM : 12030223816

Program Studi : Ilmu Al-Qur'an dan Tafsir

Telah dimunaqasyahkan dalam sidang panitia Ujian Sarjana Fakultas Ushuluddin Universitas Islam Negeri Sultan Syarif Kasim Riau, pada:

Hari : Selasa

Tanggal : 09 Juli 2024

Sehingga skripsi ini dapat diterima sebagai syarat untuk memperoleh gelar Sarjana Agama (S.Ag) dalam Program Studi Ilmu Al-Qur'an dan Tafsir Fakultas Ushuluddin Universitas Islam Negeri Sultan Syarif Kasim Riau.



Dr. Jamaluddin, M. Ush
NIP. 19670423199303 1 004

Panitia Ujian Sarjana

Ketua

Dr. H. M. Ridwan Hasbi, Lc., M.Ag
NIP. 19700617200701 1 033

Sekretaris

Usman, M.Ag
NIP. 19700126199603 1 002

MENGETAHUI

Penguji III

H. Agus Firdaus Chandra, Lc., M.A
NIP. 19850829201503 1 002

Penguji IV

Prof. Dr. H. Afrizal, M. MA,
NIP. 19591015198903 1 001



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FACULTY OF USHULUDDIN

Jl. H.R. Soebrantas No.155 KM.15 Simpang Baru Panam Pekanbaru 28293 PO.Box.1004 Telp. 0761-562223
Fax. 0761-562052 Web. www.uin-suska.ac.id, E-mail: rektor@uin-suska.ac.id

UIN SUSKA RIAU

Dr. H. Khairunnas Jamal, S. Ag, MA

DOSEN FAKULTAS USHULUDDIN

UNIVERSITAS ISLAM NEGERI SULTAN SYARIF KASIM RIAU

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Perihal : Pengajuan Skripsi

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NIP. 197311052000031003

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Fax. 0761-562052 Web. www.uin-suska.ac.id, E-mail: rektor@uin-suska.ac.id

UIN SUSKA RIAU

Drs. Saifullah, M.Us.

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UNIVERSITAS ISLAM NEGERI SULTAN SYARIF KASIM RIAU

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Kepada Yth:

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NIK. 196604021992031002

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5. pernyataan ini saya buat dengan sesungguhnya dan apabila dikemudian hari terdapat penyimpangan dengan ketidakbenaran dalam pernyataan ini, maka saya bersedia menerima sanksi akademik sesuai dengan peraturan yang berlaku

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MOTTO

There is always a price in a process. Just enjoy the tiredness. Expand that sense of patience. Everything you invest to make yourself the person you dream of, may not always go smoothly. But those waves are what you can tell about.”

(Boy Candra)

“Start with confidence, carry out with sincerity and finish with happiness”

(Anonym)

“Other people won't understand our struggles and difficult times, all they want to know is the success story. So fight for yourself even though no one will applaud you. In the future, our future selves will be very proud of what we fought for today This.

So keep fighting, okay?”

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FOREWORD

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Alhamdulillah rabbi'l 'aalamin, praise and thanks be to the presence of Allah SWT for His mercy and grace, which are always bestowed upon us all. Then, *sholawat* and greetings to the Prophet Muhammad SAW, who has transmitted the treatise and *Syari'ah* of Islam to all mankind. By the grace of Allah SWT, the writer is finally able to complete the thesis entitled **"REINTERPRETATION OF VERSES ABOUT PLANT POLLINATION AND ITS RELEVANCE TO BOTANICAL SCIENCE."**

This research is a requirement for obtaining a Bachelor of Religion from the Faculty of Ushuluddin, State Islamic University of Sultan Syarif Kasim Riau. Thanks to the trust and support of some people, both moral and material, the author was able to face and overcome the difficulties and obstacles, so that the research could be completed. On this occasion, the author would like to express his gratitude to some parties, for the help, guidance and encouragement, so that the author can finish, namely to:

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6. All lecturers who have provided knowledge and lecture materials to the the author. So that the author can gain knowledge related to the material taught and also get wisdom that is a provision in life after this. after this. May Allah always bestow mercy and give the most the most beautiful reply to all my teachers.
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13. And lastly for Myself, Dwi Angraini who has been able to carry out the mandate to complete the requirements to obtain a degree on time, thank you for being able to endure various processes of struggle and thank God have finished up to this point. Thank you for being strong and great in completing one of the biggest responsibilities of parents and families' hopes.

The author is fully aware that this thesis is far from perfect. Therefore, constructive criticism and suggestions from various parties are highly expected and hopefully this thesis will become useful knowledge, *Aamiin*.

Regards,

Dwi Angraini

NIM. 12030223816

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A GUIDE TO ARABIC transliteration

The transliteration of Arabic-Indonesian letters in this text is based on the Joint Decree of the Minister of Religious Affairs and the Minister of Education and Culture of the Republic of Indonesia, dated January 22, 1988, No. 158/1987 and 0543.b/U/1987, as stated in the Arabic Transliteration Manual (*A Guide to Arabic Literation*), INIS Fellow 1992.

A. Consonant

Arabic	Latin	Arabic	Latin
ا	A	ط	Th
ب	B	ظ	Zh
ت	T	ع	'
ث	Ts	غ	Gh
ج	J	ف	F
ح	H	ق	Q
خ	Kh	ك	K
د	D	ل	L
ذ	Dz	م	M
ر	R	ن	N
ز	Z	و	W
س	S	هـ	H
ش	Sy	ء	'
ص	Sh	ي	Y
ض	Dl		

Vocal
 َ = a

Long Vocal
 َ = Ā

Example
 تَكَاثُر = takâtsur

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◌◌◌ = i
◌◌◌ = u

يَ = Ī
وِ = Ū
أَ = Aw
أَي = Ay

يَهَيِّجُ = yahîj
تَعْلَمُونَ = ta'lamûn
سَوْفَ = sawf
عَيْنٌ = 'ayn

B. Long Vocals and Diphthong

Each Arabic writing in the form of *fathah* vocal Latin writing is written with “a”, *kasrah* with “i”, *dloimah* with “u” while the long readings are each written in the following way:

Vocals (a) long = Ā for example قَالَ become qâla

Vocals (i) long = î for example قِيلَ become qîla

Vocals (u) long = Ū for example دُونَ become dûna

Especially for the reading of ya[‘] nisbat, it should not be replaced with “i” but still written with “iy”: in order to describe ya[‘] nisbat at the end. Likewise, for the sound of the diphthong, wawu, and ya[‘] after *fathah* is written with “aw” and “ay”. Consider the following example:

Diphthong (aw) = َوَ for example قَوْلٌ become qawlun

Diphthong (ay) = َيَ for example خَيْرٌ become khayrun

C. Ta' Marbûthah (ة)

Ta' *marbûthah* is transliteration with "t" if it is in the middle of a sentence, and if ta' *marbûthah* is at the end of the sentence, it is transliterated by using "h". Such as الرِّسَالَةُ لِلْمُدَّرِسَةِ to *al-risalat li al-mudarrisah*, or when in the middle of a sentence consisting of *mudlaf* and *mudlaf ilayh* arrangement, then transliterated by using t connected with the following sentence, for example, فِي رَحْمَةِ اللَّهِ become *fi rahmatillah*.

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D. Articles and Lafadz al-jalâlah

The word “al” (ال) is written in lowercase unless it is located at the beginning of the sentence, while “al” in Jalâlah lafadz, which is in the middle of the sentence propped (*idlafah*) is then omitted. Consider the following examples:

1. Al-Imâm al-Bukhâriy say...
2. Al-Bukhâri, in the opening of the book, explained...
3. Masya ‘Allâh kâna wa mâ lam yasya’ lam yakun.

ABSTRAK

Skripsi ini berjudul “Reinterpretasi Ayat- Ayat Tentang Polinasi Tumbuhan Dan Relevansinya Dengan Ilmu Botani.” Penelitian ini dilatarbelakangi oleh pesatnya perkembangan penafsiran Qur’an dengan menggunakan ilmu pengetahuan. Penelitian ini bertujuan untuk mengetahui bagaimana para mufassir menafsirkan ayat- ayat tentang polinasi tumbuhan dan menganalisis relevansinya dengan pengetahuan dalam ilmu botani. Bentuk penelitian ini adalah kualitatif dan bersifat kepustakaan dengan menggunakan perspektif tafsir ilmi untuk mengungkapkan relevansi Qur’an dengan ilmu botani. Hasil dari penelitian ini menunjukkan bahwa polinasi dalam penafsiran Qur’an terjadi dengan bantuan angin yang mengacu pada kata lawaqih dalam surat al- hijr ayat 22, kemudian dijelaskan juga dalam surat an- nahl ayat 68-69 bahwasannya proses polinasi dengan peran lebah yaitu dengan berpindahnya lebah dari bunga satu ke bunga lainnya yang secara tidak langsung menyebabkan terjadinya polinasi. Hal ini relevan dengan kajian ilmu botani dimana dalam penafsiran Quran surat al- hijr ayat 22, perkawinan tumbuhan bisa terjadi secara generatif yang dilakukan dengan bantuan angin (*anemogami*) lalu di surat an- nahl ayat 68-69 relevan dengan proses polinasi melalui perantara hewan (*zoidiogami*) atau lebih spesifik disini dengan bantuan lebah.

Kata Kunci: Reinterpretasi, Polinasi, Ilmu Botani

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ABSTRACT

This undergraduate thesis was entitled “Reinterpretation of Verses about Plant Pollination and Their Relevance to Botanical Science”. This research was instigated with the rapid development of interpretation of Al-Qur’an by using science. This research aimed at finding out how the commentators interpreted verses about plant pollination and analyzing their relevance to knowledge in botany. It was qualitative library research with scientific interpretation perspective to reveal the relevance of Al-Qur’an to botany. The research findings showed that pollination in the interpretation of Al-Qur’an occurs with the help of wind which refers to the word of *lawaqih* in Surah Al-Hijr verse 22, then it is also explained in Surah An-Nahl verses 68-69 that the pollination process involves the role of bees—by moving bees from one flower to another, which indirectly causes pollination. This is relevant to the study of botany that in the interpretation of Al-Qur’an, Surah Al-Hijr verse 22, plant mating can occur generatively, it is carried out with the help of the wind (*anemogamy*), then in Surah An-Nahl, verses 68-69, it is relevant to the process of pollination through animal intermediaries (*zoidiogy*) or more specifically with the help of bees.

Keywords: Reinterpretation, Pollination, Botanical Science



المخلص

هذه البحث بعنوان "إعادة التفسير للآيات المتعلقة بتلقيح النبات ومناسبتها بعلم النبات". انطلق هذا البحث من التطور السريع لتفسير القرآن باستخدام العلوم، ويهدف إلى معرفة كيفية تفسير المفسرين للآيات المتعلقة بتلقيح النبات وتحليل مناسبتها بعلم النبات. وأما شكل هذا البحث فهو نوعي ومكتبي باستخدام منظور التفسير العلمي للكشف عن مناسبة القرآن بعلم النبات. ونتائج البحث تشير إلى أن التلقيح في تفسير القرآن يحدث بمساعدة الرياح التي تشير إلى كلمة لواقع في سورة الحجر الآية ٢٢ ، ثم تم شرحها أيضا في سورة النحل الآيات ٦٨-٦٩ أن عملية التلقيح مع دور النحل تتم عن طريق نقل النحل من زهرة إلى أخرى مما يسبب التلقيح بشكل غير مباشر. وهذا متناسب بدراسة علم النبات حيث يوجد في تفسير القرآن سورة الحجر الآية ٢٢ ، ويمكن أن يحدث تزاوج النبات بطريقة توليدية تتم بمساعدة الرياح (anemogamy) ثم في سورة النحل الآيات ١٨-٢٤ ذات الصلة بعملية التلقيح من خلال وسطاء من الحيوان (zoidiogamy) أو بشكل أكثر تحديدا بمساعدة النحل.

الكلمات المفتاحية: إعادة التفسير، التلقيح، علم النبات

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CHAPTER I INTRODUCTION

A. Research Background

The Qur'ān was not compiled as a scientific textbook on science, but rather as a guide for human beings. However, it does provide a view of the world that can be the basis for scientific understanding within an Islamic framework. The Qur'an explains that the phenomena of the universe are signs of God that must be studied and properly understood. This leads to scientific activity, while keeping in mind the spiritual dimension. In other words, scientific understanding should not only limit itself to understanding natural phenomena of a physical nature (natural causes), but should also reach a deeper understanding of the Creator (divine causes), who is the true cause of everything.¹

The history of the relationship between Islam and science dates back to the emergence of Iğam around the 17th century. While the West was still experiencing a dark period in the development of empirical science, Islam was making rapid progress in the field of science. science and science are an important part of the content of the Qur'an, where Allah has conveyed the basic concepts in science and science. Humans only need to explore and develop these concepts further. All the evidence that has been observed shows that the Qur'an is a book that contains news that is proven to be true.²

The Qur'an is still global in nature, therefore interpretation greatly affects the level of human understanding and knowledge. Tafsir is a product of human thought that seeks to explain and reveal how the mâkna of the verses of the Quran. Tafsir is relative and dzanni, which is always undergoing development from time to time in accordance with the human mindset. So there needs to be a development in terms of approaches to support the interpretation. One of them is the scientific approach, which reveals the meaning of the Qur'an with a scientific approach. Science is a human product and therefore carries a human worldview

¹ Imron Rossidi, *Fenomena Flora & Fauna dalam Al-Qur'an*, (Malang: UIN Maliki P̄rss, 2014), hlm.11-16.

² M. Anugrah Arifin, *Islam dan Sains paradigm Integrasi*. (Yogyakarta: CV. Budika Utama, 2018), hlm. 4-5.



behind it. Science can be said to be a human product in investigating something that it finds. This can also prove whether the Qur'an is relevant to the times and advances in the field of scientific knowledge.

Modern interpretation is an effort to reinterpret the verses of the Qur'an to be adapted to the current modern era. Modern interpretation appears to deconstruct some classical interpretations that are considered no longer relevant to current situations and conditions, as well as reconstructing new interpretations in accordance with modern reasoning. The development of science makes some Muslim intellectuals have the view that tafsir must be understood using a new approach that is in line with scientific findings. Such interpretation is known as tafsir ilmi. Yusuf Qardhawi defines tafsir ilmi as tafsir that uses the sciences of the cosmos, both in terms of its nature and theories. The cosmic sciences referred to are physics, astronomy, geology, chemistry, biology, medicine, physiology, including the humanities and social sciences such as psychology, social science, and theology.³

The Qur'an is not only about kauniyah verses (signs of God's greatness), but also the basis of science and science or called kauniyah verses (the universe). The Qur'an mentions at least 750 to 1000 verses that indicate science.⁴ Scientific discoveries have made scientists marvel at the veracity of the Qur'an that was recorded several centuries ago. This proves the harmony between the Qur'an and science, One of them is the discussion of plants

The Qur'an has a comprehensive essence of the verses of the universe. One thing that is often forgotten is about the plant world. Plants are a theme that is mentioned a lot in the Qur'an. Mention of words or terms that are similar to plants⁵In Jamaluddin Husein Mahran's presentation there are 112 verses spread across 47 letters, which mention 16 types of plants in the Qur'an⁶.Meanwhile,

³ Yusuf Qardhawi, *Kaifa Nata'amal Al-Qur'an Al-Adzim* (Cairo: Dar Asy-Syuruq, 2000) P. 369

⁴ Fatimah, *Ayat Ayat Sains Dalam Al-Qur'an (Telaah Balaghah)*. Al-Hikmah. Vol. 5 Tahun 2017, P.1

⁵ Dewi Rosanti, *Morfologi Tumbuhan*, (Jakarta: Erlangga, 2013), p.1

⁶ Jamâl Ad-Dîn Husein Mahran, *An-Nabatât Fî Qur'an Al Karîm*, (Kairo: Kementrian Wakaf Mesir, 2000), p. 7 in Lajnah Pentashihan Mushaf Qur'an ,

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according to Sayyed Abdul Sattar al-Miliji, the verses that talk about plants from various aspects total 115⁷. The Qur'an mentions plants as parables and describes the physical form (morphology of plants⁸) and its benefits for human life⁹. Through various verses about plants, the Qur'an invites human reason and hearts to recognize the oneness and power of Allah SWT. The process of the plants that surround them and are always witnessed is truly amazing if you pay close attention, from the initial process until they finally produce fruit.¹⁰

Plant reproduction is very important for the survival and development of more plants. However, before breeding, of course there is a pollination process between the pollen and the stigma to produce fruit. Reporting from the US Forest Service, pollination is the activity of transferring pollen from the male flower head to the female stigma. The meeting of pollen and pistils will result in sexual reproduction in the form of shedding gametes in plants. Pollination in plants is usually assisted by various intermediaries, namely wind, water, insects, birds and also humans.¹¹

When viewed from a scientific perspective, this pollination phenomenon has been known through the research process of experts who have proven this process. But who would have thought, this great discovery was immortalized and described first in the Qur'an, long before modern science existed. As Allah stated in QS. Al-Hijr [15]: 22 as follows.¹²

وَأَرْسَلْنَا الرِّيحَ لَوَاقِحَ فَأَنْزَلْنَا مِنَ السَّمَاءِ مَاءً فَأَسْقَيْنَاكُمُوهُ وَمَا أَنْتُمْ لَهُ بِخَزَائِنَ ۚ (الحجر/15: 22-22)

Pelestarian Lingkungan Hidup (Tafsir Qur'an Tematik), (Jakarta : Lajnah Pentashihan Mushaf Qur'an, 2009), p. 179

⁷ Sayyed Abdul Sattar Al-Miliji, *Ilmu An-Nabât Fî Qur'an Al-Karîm*, (Kairo : Al Hay'ah Al- Mishriyyah Al-Ammah Li Al-Kitâb, 2005), in Lajnah Pentashihan Mushaf Al-Qur'ân, *Pelestarian Lingkungan Hidup (Tafsir Qur'an Tematik)*, p. 179

⁸ Yayan Sutrian, *Pengantar Anatomi Tumbuhan*, (Jakarta : PT. Rineka Cipta : 2011), p.10; Dewi Rosanti, *Morfologi Tumbuhan*, p.1

⁹ Lajnah Pentashihan Mushaf Qur'an, *Tumbuhan Dalam Perspektif Qur'an Dan Sains*, (Jakarta : Lajnah Pentashihan Mushaf Qur'an, 2011), Cet.I, p. 9

¹⁰ [https://TafsiralQur'an .Id/Tafsir-Ilmisurah-Alhijr-Ayat-22-Tentang-Penyerbukan-Tumbuhan-Melalui-Angin](https://TafsiralQur'an.Id/Tafsir-Ilmisurah-Alhijr-Ayat-22-Tentang-Penyerbukan-Tumbuhan-Melalui-Angin) Accessed on 09 July 2024 at 20.50

¹¹ <https://Www.Kompas.Com/Skola/Read/2021/07/05/163643469/Macam-Macam-Penyerbukan-Berdasarkan-Perantaranya> Accessed on 09 July 2024 at 20.50

¹² <https://TafsiralQur'an .Id/Tafsir-Ilmisurah-Alhijr-Ayat-22-Tentang-Penyerbukan-Tumbuhan-Melalui-Angin> Accessed on 09 July 2024 at 20.50



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And We have sent the fertilizing winds¹³ and sent down water from the sky and given you drink from it. And you are not its retainers.

Apart from being beneficial for humans and animals, wind is also beneficial for plants. The benefits of wind for plants help the process of pollinating flowers in plants. With the help of the wind, the stamens can pollinate the flower pistil and after that fertilization occurs and seeds are formed which will then become new individuals or plants.¹⁴

Apart from pollination assisted by wind, the pollination process is also mentioned in the Qur'an as being carried out with the help of insects, more specifically bees. Insects have a role in the food chain, namely the link between producers and consumers. Apart from that, insects also act as parasitoids, predators, scavengers, pollinators and as transmitters of disease seeds. The role of insects as a pollination service by visiting insects is stated in the Al-Qur'an , Surah An-Nahl verses 68-69, which reads:

وَأَوْحَىٰ رَبُّكَ إِلَى النَّحْلِ أَنْ اتَّخِذِي مِنَ الْجِبَالِ بُيُوتًا وَمِنَ الشَّجَرِ وَمِمَّا يَعْرِشُونَ ۖ ٦٨ ثُمَّ كُلِي مِن كُلِّ الثَّمَرَاتِ فَاسْلُكِي سُبُلَ رَبِّكِ ذُلُلًا يَخْرُجُ مِنْ بُطُونِهَا شَرَابٌ مُّخْتَلِفٌ أَلْوَانُهُ فِيهِ شِفَاءٌ لِّلنَّاسِ ۗ إِنَّ فِي ذَٰلِكَ لَآيَةً لِّقَوْمٍ يَتَفَكَّرُونَ ٦٩ (النحل/16: 68-69)

And your Lord inspired to the bee, "Take for yourself among the mountains, houses [i.e., hives], and among the trees and [in] that which they construct. Then eat from all the fruits¹⁵ and follow the ways of your Lord laid down [for you]." There emerges from their bellies a drink, varying in colors, in which there is healing for people. Indeed in that is a sign for a people who give thought.

In the verse above it is stated that visitor insects have one role as pollinators. Activities carried out by visiting insects apart from helping with pollination are looking for food sources such as nectar and pollen. This is what causes pollination to occur because the pollen sticks to the insect's body. In the letter An Nahl verses 68-69 it is stated that the insects that visit flowers to help pollinate them and produce honey are bees.

¹³ Causing precipitation in rainclouds or carrying pollen. Another meaning is "pregnant winds," i.e., those carrying rainclouds

¹⁴ A'limna Qurrota A'yun, *Angin Dalam Perspektif Al-Qur'an (Studi Tafsir Tematik)*, Skripsi Fakultas Ushuluddin Iain Ponorogo 2019, p. 29.

¹⁵ i.e., delicious substances found by the bee.

Real proof of the greatness of Allah SWT through scientific events that are beyond reason contained in the Qur'an . The verses about bees in the Qur'an provide several clues to scientific miracles. The miracles of the Qur'an will continue to be revealed from time to time to prove various scientific miracles such as the pollination process.¹⁶

Based on the background description above, researchers are interested in studying further regarding plants and their pollination processes in the interpretation of the Qur'an contained in Surah Al- Hijir verse 22 and Anahl verses 68-69 and also from the perspective of botany. This research seeks to examine the verses of the Qur'an using contemporary scientific tools.

B. Term of Affirmation

To avoid misunderstandings about the terms used in this research, definition of terms will be used, including the following:

1. Pollination

Pollination or it can also be called pollination, which is a term that comes from English, pollination cf. pollen which means "pollen". This process is the process of attaching pollen from the stamen which is the male reproductive organ to the pistil which is the female reproductive organ.¹⁷In various types of flowers, this process often "falls on the stigma". In short, pollination is the process of mating or reproduction in plants to produce fruit or new plants.

Pollination is an important part of the reproductive process of seed plants.¹⁸Pollination is also referred to as a plant fertilization process which is characterized by the fall of pollen on the surface of the pistil. Pollination can occur in open seed plants and flowering plants. In open seed plants, the pollen

¹⁶Ismi Alifah, 2020 "Aktivitas Serangga Pengunjung Bunga Zinnia (*Zinnia Elegans*) Di Kebun Agrowisata Kwt Aisyiyah Cirebon". Skripsi Fakultas Sains Dan Teknologi Uin Sunan Gunung Djati Bandung p. 1

¹⁷Rafika Elsa Oktaviani, Zarkasih, Rian Vebrianto, "Pemahaman Konsep Guru Dan Calon Guru Tentang Integrasi Sains Islam Pada Materi Reproduksi Pada Tumbuhan"Jurnal Basicedu Vol. 4 Tahun 2020, p. 213

¹⁸<https://www.gamedia.com/literasi/penerbukan/>. Accessed December 30, 2023 at 20:10

must reach the pollination drop, while in flowering plants, the pollen must reach the stigma.¹⁹

2. Botanical Science

Botany is the science that studies plant life, including the structure and function of the plant body which includes the cells and organelles that make up plant cells, plant morphology, plant anatomy, plant physiology and plant cultivation.²⁰ Etymologically, botany comes from the Greek word botane, which means grass or pasture²¹. This science is a branch of Biology which specifically studies everything about plant life. Plants are living creatures that have a very important role in human life, therefore plants are studied specifically through botany.²² In another sense, botany is the science that studies organisms that can carry out photosynthesis, namely plants.²³

C. Identification of the Problems

From the background that the author has explained, the author finds several problems that can be identified, namely as follows:

1. Qur'an perspective on the process of plant pollination.
2. There are verses that explain the benefits resulting from pollination, such as fruit and honey.
3. The interpretation of the scholars is related to the verse that talks about the plant pollination process described in the Qur'an .
4. The pollination process in botany can occur through various mechanisms, including wind, insects, etc.
5. Moral values and messages that we can take from the verses of the Qur'an related to plant pollination.

¹⁹Susilawati Dan Bachtiar, N. (2018). *Biologi Dasar Terintegrasi (PDF)*. Pekanbaru: Kreasi Edukasi. p. 112. ISBN 978-602-6879-99-8

²⁰Risanti Dhaniaputri, *Ilmu Botani Sebagai Dasar Keanekaragaman Jenis Tumbuhan Dalam Pelestarian Lingkungan*, Snps, 2017 p. 338

²¹Liddell, Henry George; Scott, Robert (1940). *Botane (Βοτάνη)*. Oxford: Clarendon Press Via Perseus Digital Library, Tufts University. Accessed on 2024-04-08. at 12.30 Wib

²²https://www.datik.com/edu/datikpedia/d-6302180/mengenal-ilmu-botani-dan-cabang-cabangnya#Google_Vignette Accessed December 30, 2023 at 20.44

²³Reza Ardiansyah Dkk, "Botani", Widina Media Utama: 2023 p. 2



D. Research Limitation

So that this research can be carried out more focused, perfect and in-depth, the author views that the research problems raised need to be limited in terms of variables. Therefore, the author limits the research to only the process of plant pollination which has been explained in the Qur'an in Q.S Al-Hijr verse 22 and An-Nahl verses 68-69 and how the scholars interpret these verses by using three reference sources of tafsir namely tafsir al jawahir, mafatihul ghaib, and alquran and its interpretations, as well as how science views in botany regarding the process of pollination.

E. Formulation of Problem

Based on the description of the background of the problem, the questions that will be asked to answer all forms of problems in this research are:

1. How mufassirs interpret verses about the process of plant pollination in the Qur'an?
2. How is the relevance between the interpretation of the verses about plant pollination in the Qur'an with science botanical science?

F. Research Objectives and Research Significant

1. Research purposes

There are several objectives of this research, including the following:

- a. Know the interpretation of verses about the process of plant pollination in the Qur'an .
- b. Know the relevance of the interpretation of verses about plant pollination in the Qur'an and botanical science.

2. Benefits of research

The benefits that will be obtained from this research are as follows:

- a. Academically, it can be useful as a theoretical contribution to increase insight, information and experience in writing works about plants in the literature on the interpretation of the Qur'an and in scientific reviews.and can be used as a reference in further library research, especially in the field of Qur'an interpretation.

b. Practically speaking, is development for related institutions/institutions²⁴

The results of this research are useful for the community to increase insight into the knowledge of interpretation and provide a positive contribution to the understanding of plants and their pollination processes in the study of interpretation of the Qur'an for Muslims and increase awareness of how important it is for us as Muslims to know the general interpretation that has developed.

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G. Research Methods

1. Types Of Research

As for this type of research, the author uses library research with a scientific approach, namely by reading, studying and reviewing books and written sources that are closely related to the problem discussed, namely plant pollination in the Qur'an and its relevance to botany. In this case the author collected several sources including books relevant to the research topic, journals and scientific articles related to plant pollination in the Qur'an and its relevance to botany.

Meanwhile, the interpretation method used is the thematic method. What is meant by the thematic method is discussing the verses of the Qur'an according to a predetermined theme or title. All related verses are collected. Then it is studied in depth and thoroughly on various aspects related to plant pollination in the Qur'an and its relevance to botany, such as asbab nuzul, vocabulary, and so on. Everything is explained in detail and thoroughly, and supported by arguments or facts that can be scientifically justified, whether the arguments come from the Qur'an, hadith, or rational thinking.²⁵

²⁴ Tim Penyusun Pedoman Penyusunan Dan Penulisan Skripsi Fakultas Ushuluddin Universitas Islam Negeri Sultan Syarif Kasim Riau, *Pedoman Penyusunan Dan Penulisan Skripsi*, (Pekanbaru: Fakultas Ushuluddin, 2021), p. 17.

²⁵ Nasrhuudin Baidan, *Metodologi Penafsiran Al-Qur'an*, (Yogyakarta: Pustaka Pelajar, 2012), p. 151

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2. Research Approach

The approach that the author uses in writing this research is a scientific approach in botany which is related to plant pollination in the Qur'an , namely by explaining scientific knowledge related to the interpretation of verses about plant pollination

3. Data Source

Data sources are all information or information regarding anything related to the research objectives. In this research there are two research sources, namely primary data sources and secondary data sources, as follows:

- a. According to Sugiono, primary data is a source of data that is directly related to the main discussion to be studied.²⁶The primary data sources in this research are: Primary data sources are authentic data or data that comes from the first source. In this research, the primary sources referred to are the Qur'an and scientific-based commentaries such as the Tafsir Mafatih Al Ghaib by Fakhruddin Arrazi, Tafsir Al-Jawahir by Tantawi Jauhari, and also the Tafsir of the Indonesian Ministry of Religion.
- b. Secondary data sources are data sources taken from other sources that are related to primary sources. This secondary data functions as a complement to primary data, this data contains writings related to the material to be studied. In this thesis, the secondary books referred to are in the form of supporting books such as e-books, journals and articles related to plant pollination in order to enrich and complete primary data sources.

4. Techniques of Data Collection

Data is information obtained through certain measurements to be used as a basis for constructing logical arguments into facts. Data collection techniques are a strategic step in research because the aim of the research is to obtain data.²⁷

²⁶ Sugiyono, *Metode Penelitian Kuantitatif Kualitatif*, (Bandung: Alfabeta: 2007), p. 225

²⁷ Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif Dan R &D*, (Bandung: Alfabeta, 2011), p. 224.

In researching this study, the author used the Maudu'i method. In the data collection stage, the author used the Maudhu'i method, namely collecting verses that are relevant to plant pollination, then analyzing them inductively to produce a comprehensive understanding.

- a. Select or determine the problem of the Qur'an that will be studied maudu'i (thematically). So the theme that will be discussed is plant pollination in the interpretation of the Qur'an and botany.
- b. Track and collect verses related to the problem that has been determined, makkiyyah and madaniyyah verses.
- c. Arrange the verses in a coherent manner according to the chronology of their revelation, accompanied by knowledge of the background to the revelation of the verse or asbabun an-nuzul. .
- d. Know the correlation (munasabah) of these verses in each letter.
- e. Arrange the discussion theme in a suitable, systematic, perfect and complete framework (outline).
- f. Complete the discussion and explanation with hadith, if deemed necessary, so that the discussion becomes more complete and clearer.
- g. Study these verses thematically and comprehensively by collecting verses that contain similar meanings, compromising between the meanings of 'am and khash, between muthlaq and muqayyad, synchronizing verses that appear contradictory, explaining the nasikh and mansukh verses , so that all the verses meet at one end, without differences and contradictions or acts of forcing some verses to meanings that are actually incorrect.²⁸

5. Techniques of Data Analysis

Data analysis is a way of working with data, searching for data, recording and collecting it. After all the necessary data has been collected, the next step is the data processing or analysis process.

²⁸Abd. Al- Hayy Al- Farmawi, *Metode Tafsir Maudu'iy: Sebuah Pengantar Ahli Bahasa*, Suryan A. Jamrah, Cet.1 (Jakarta: Pt. Raja Grafindo Persada, 1994) P. 45- 46..

In this analysis the author uses the data analysis technique modeled by Miles and Huberman (1984) which suggests that activities in qualitative data analysis are carried out interactively and continue continuously until completion, so that the data is saturated.²⁹Activities in the Miles and Huberman model data analysis, namely: data reduction, data display, and conclusion drawing/verification. The explanation is as follows:

a. Data Reduction (Data Reduction)

Reducing data means summarizing, selecting the main things, focusing on important things, looking for themes and patterns so that the reduced data will provide a clearer picture and make it easier for researchers to carry out further data collection and search if necessary.³⁰The essence of data reduction is processing and preparing data to draw conclusions regarding the reinterpretation of verses about plant pollination and its relevance to botanical science.

b. Data Display (Data Presentation)

After reducing the data, the next step is to present the data. In qualitative research, data presentation can be done in the form of short descriptions, charts, flowcharts and the like.³¹However, the presentation of data that is often used in qualitative research is narrative text. Matthew and Michael state that data presentation is a collection of structured information that provides the possibility of drawing conclusions and taking action. At this stage the researcher analyzes the data by linking the research results with research discussions regarding reinterpretation of verses about plant pollination and its relevance to botanical science.

c. Conclusion Drawing

The final stage in qualitative data analysis according to Miles and Huberman is drawing conclusions and verification. The initial conclusions put forward are still temporary, and change according to other findings in subsequent data collection. A conclusion that can

²⁹ Sugiyono, *Metode Penelitian Kuantitatif Kualitatif*, (Bandung: Alfabeta: 2007), p. 246.

³⁰ *Ibid* p. 247

³¹ *Ibid* p. 249

answer the initial question supported by supporting data is a valid and consistent (credible) conclusion.³²At this stage, the researcher will draw conclusions that will answer the problem formulation that has been created by the researcher, namely regarding the pollination process described in the interpretation of the Qur'an .



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³² *Ibid* p.253.

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CHAPTER II THEORETICAL FRAMEWORK

A. Theoretical Basis

1. Scientific Tafsir

a. Definition of scientific interpretation

Epistemologically, the interpretation that comes from Arabic is the word *fasarra yufassiru interpretation* which means checking, showing or meaning the word *الايضاح والسرّح* which means explanation or comment³³

Meanwhile, in terms of terminology, it is a scientific discipline for understanding the Qur'an, explaining the meanings in the Qur'an, and revealing the laws and secrets in the Qur'an.³⁴

Meanwhile, the meaning of *ilmu* means science.³⁵ Further examining the word *ilmu*, Quraish Shihab explained that science in this context is limited to the scope of science which includes *sunnatullah* natural laws that someone may be able to witness through natural events under certain conditions.³⁶

The expression *tafsir ilmu* can also be termed scientific *tafsir*, which is an expression in the interpretation of the Qur'an which specializes in the object of study in *kauniyyah* verses or natural science (science) verses and explores the theories of natural law contained in the Qur'an.³⁷

In scientific interpretation, the principle is that the Qur'an precedes modern science, therefore the Qur'an does not conflict with modern science. So with this principle, many of *mufassir* who interpret the

³³ Eni Zulaiha, *Tafsir Kontemporer: Metodologi, Paradigma Dan Standar Validasinya*, Wawasan: Jurnal Ilmiah Agama Dan Sosial Budaya 2.1 (2017) 81-94, p. 82

³⁴ *Ibid*

³⁵ Ahmad Warson Munawir, *Al-Munawir Kamus Arab-Indonesia*, (Yogyakarta: Pustaka Progresif, 1999), p. 1037.

³⁶ M. Quraish Shihab, *Membumikan AlQur'an*, (Bandung: Mizan, 1992), p. 63

³⁷ Andi Rosadisastra, *Metode Tafsir Ayat- Ayat Sains Dan Sosial* (Jakarta: Amzah, 2007), p. 47.

Qur'an using a scientific style, because the Qur'an is in harmony with science and is a source of Islamic teachings.³⁸

As for referring to the interpretation of 'ilmy in the terminology of para Mufassir and scientists expressed several opinions:

- 1) According to Fahd al-Rumi, "scientific interpretation" is: Ijtihad of a mufassir in finding the relationship between the kauniyah (*cosmos*) verses of the Qur'an and the discoveries of experimental sciences that aim to reveals the miracles of the Qur'an as a source of knowledge appropriate and consistent at all times and places.³⁹
- 2) Abd Al-Majid Al-Salam Al-Mustahib explains in his book *littihajat al-tafsir fi- al-ashr al-hadith* that scientific interpretation is interpret verses related to nature to adapt to existing scientific theories and try explore scientific problems and philosophical thoughts. (Abd al-salam al-mustahib, Abd al-majid, 1973⁴⁰)
- 3) Muhammad Husain Al-Dzahabi scientific interpretation: discussion of aspects of science contained in the Qur'an as well an effort to reveal various knowledge and thoughts contained therein.⁴¹

So, in short, tafsir 'ilmi is a style of interpretation of the Qur'an whose object of study is focused on the kauniyyah verses or verses that contain a scientific nature in the Qur'an in order to reveal the various knowledge implicit in them.

b. History and development of scientific interpretation

In fact, historically this style of scientific interpretation has long been known. The seeds began during the Abbasid dynasty, especially during the reign of Caliph Al Ma'mun (d. 853 AD), it all started as a result of the translation of scientific books which were initially intended to try to find

³⁸ Putri Maydi Arafatun Anhar, Imran Sadewo, M. Khoirul Hadi Al-Asy Ari, *Studi Metode Penafsiran Berbasis Ilmu Pengetahuan Pada Tafsir Kemenag. Prosiding Konferensi Integrasi Interkoneksi Islam Dan Sains, 1*, p 110.

³⁹ *Ibid*

⁴⁰ *Ibid.*

⁴¹ Muhammad Al-Said Husain Al-Dzahabi, *Al-Tafsir Wa Al-Mufassirun* (Al-Qāhirah: Maktabah Wahbah, Tth (Maktabah Syamilah), 349. 0099



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a match between the statements expressed in the Qur'an and the results of scientific discoveries (science).⁴²

As for its development in the context of proving the truth of the Qur'an, it has posed a challenge to anyone who doubts it to compose a "like" Qur'an. These challenges come in stages:

- 1) The entire Qur'an (QS 17: 88: 52: 34).
- 2) Ten surahs from his 144 surahs (QS 11: 18).
- 3) One surah (QS. 10: 38).
- 4) More or less one surah (QS. 2: 23).⁴³

Such a meaning must include all kinds of aspects contained in the Qur'an, one of which is its content which, among other things, relates to science that was not yet known at the time of its revelation. From this it is not surprising that while Muslims are trying to prove the miracles of the Qur'an, or its truths as Divine revelation through interpretation, in accordance with the development of science, although it is not uncommon to feel that there are "coercions" in these interpretations which, among other things, are caused by the desire to prove scientific truth through the Qur'an, and not vice versa.⁴⁴ So it can be concluded that this 'Ilmi' style of interpretation emerged as a result of advances in science and interpretive efforts to understand the verses of the Qur'an in line with the development of science.

The figure who most persistently supported this idea was Al-Ghazali, who at length in his books, *Ihya 'Ulumuddin and Jawahirul Qur'an* put forward reasons to prove his opinion. Al-Ghazali stated that: "All kinds of knowledge, both previous (still existing or extinct), and later, whether known or not, all originate from the Qur'an al-Karim."⁴⁵

⁴² M. Quraisy Shihab, *Membumikan Al-Qur'an: Fungsi Dan Peran Wahyu Dalam Kehidupan Masyarakat* (Bandung: PT.Mizan Pustaka, 2007), p. 154.

⁴³ Abdullah Darraz, *Al-Naba' Al-'Azhim* (Mesir: Tatbha'ah Alsa'adah, 1960), p. 77.

⁴⁴ M. Quraisy Shihab, *Membumikan Al-Qur'an* p. 153-154.

⁴⁵ Al-Ghazali, *Ihya 'Ulum Al-Din*, Jilid I (Kairo: Al-Tsaqafah Alislamiyah, 1365), p. 301.



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The second figure after Al-Ghazali was Fakhruddin Al-Razi (1209 AD), although not completely, agreed with Al-Ghazali. However, his tafsir book, *Mafâtiḥ Al-Ghaib*, is filled with scientific discussions regarding philosophy, theology, natural sciences, astronomy, medicine, and so on. Until the book of tafsir is overrated as containing everything except tafsir.⁴⁶

The development of scientific interpretation in the modern era in the 18th and 19th centuries concerned the conflicts that occurred in Europe because the condition of the Muslim scientific field was getting worse. While the West is experiencing progress in the fields of science and industry, Muslims are still in their situation, not experiencing any progress worth noting, either in the fields of science or industry. And because of this, in this era, sincere people started researching the Book of Allah (Qur'an). They assume that in the Qur'an there are many instructions about the basics of science.⁴⁷

c. Rules of scientific interpretation

The rules for mufassir who will interpret the verses of the Qur'an with 'ilmi' interpretation are as follows:

- 1) The interpretation is in line with linguistic rules. Because the Qur'an was revealed in Arabic, when interpreting scientific verses, a mufassir must understand the rules in tafsir books and dictionaries, a mufassir must also pay attention and consider the development of the meaning of a word.⁴⁸
- 2) Pay attention to the correlation of verses (*munasabah al-ayat*). Apart from mastering linguistic rules, a scientific interpreter must also pay attention to the correlation of verses, both the previous verse and the verse after. This is important, considering that the compilation of the

⁴⁶ M. Quraisy Shihab, *Membumikan Al-Qur'an ...*, p. 154

⁴⁷ Abdul Majid Abdussalam Al-Muhtasib, *Visi Dan Paradigma Tafsir Al-Qur'an Kontemporer* (Bangil : Al Izzah, 1997), p. 273.

⁴⁸ Shaikh Khalid Al-Abd Al-Rahman, *Ushul Al-Tafsir Wa Qawaiduh* (Beirut: Dar Anmafais, 1986), p. 224 Yang Di Kutip Oleh Rosadisastra, *Metode Tafsir Ayat-Ayat Sains Dan Sosial.*, p. 10



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Qur'an is not based on the chronology of the verses, but is based on the correlation of the meanings of the verses, so that the content of the previous verse is always related to the content of the next verse.⁴⁹

- 3) Based on established scientific facts. As is known, as a book of revelation, the truth of the Qur'an is acknowledged absolutely. Its authenticity and validity can be tested from various perspectives, both from historical, linguistic, supernatural news and even from scientific aspects. Therefore, the juxtaposition of the Qur'an with scientific theories that are not well established is of course unacceptable. If you pay close attention, actually juxtaposing verses from the Qur'an which have relative scientific findings is one of the main reasons why groups reject the application of 'scientific' interpretations of the Qur'an.⁵⁰

d. Advantages and disadvantages of scientific interpretation

1) Advantages of 'Scientific Tafsir:

- a) Dare to respond to modernization, renewal and the challenges of the times.
- b) Appreciating knowledge in relative terms and directing reason towards science, which helps restore balance between science and religion in life.
- c) Pursuing scientific achievements and reinterpreting them according to other people's scientific theories.
- d) Can produce new discoveries for the benefit of human life.⁵¹

2) Weaknesses of Scientific Interpretation:

- a) Turning all problems into a business as a means of communication for illiterate people, who are enthusiastic, curious and amazed at the wisdom of Allah SWT in their creatures.
- b) Forgetting social and political issues and deceiving human consciousness by being busy with topics that distance themselves

⁴⁹ *Ibid*⁵⁰ *Ibid*⁵¹ Hasan Hanafi, *Tafsir & Kemaslahatan Umat* (Yogyakarta: Nawesea Press, 2007), p. 40.



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from social and political reality, it is as if God does not appear except in nature, not in society.

- c) Starting with science and interpreting religion according to the discoveries of other people who give control to science then make religion only an imitation of it, so that science is superior to religion.⁵²
- e. Scholars' opinion

Interpreting verses that contain knowledge (kauniyyah verses) is not easy and it is a mistake for a mufassir who believes that the Qur'an is a scientific book as previously known scientific books are not a book of guidance for the happiness of this world and the hereafter. It is not surprising that in the Qur'an there are various implicit and explicit instructions relating to science, to support its function as a book of guidance. In this case, there are 2 different views of scholars, namely pros and cons. The following are several opinions of scholars who criticize (contra) and moderate the 'ilmi' style of interpretation:

- 1) The group of scholars who allow it. This group is of the view that interpreting the verses of the Qur'an using a scientific and technological approach is one of the realizations of Allah SWT's command to understand Allah SWT's creation in this universe. The classical scholars who support it include Al-Ghazali, Ar-Razi, Al-Mursi, As-Suyuthi, and from modern circles, namely Muhammad Abduh, Thantawijauhari, Hanafi Ahmad.⁵³
- 2) A group of ulama who oppose 'ilmi' interpretations. This group was pioneered by Imam Abu Ishak Ibrahim Ibn Musa al-Shatibi al-Andalusi (d. 790 AD). According to him, all of the Prophet's companions knew more about the Qur'an and its contents, but none of them stated that the Qur'an covers all branches of knowledge.⁵⁴ Then there are also those

⁵² *Ibid* H. 44

⁵³ Lajnah Pentashihan Mushaf Qur'an, *Hewan Dalam Perspektif Qur'an Dan Sains P.*

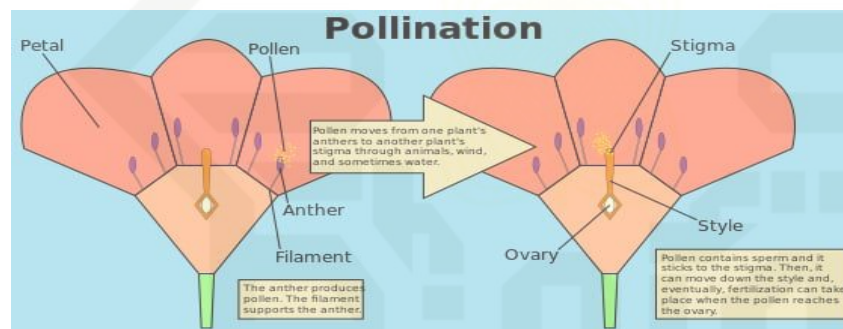
⁵⁴ Mahdi Ghulsyani, *Filsafat Sains Menurut Al-Qur'an* (Badung: Mizan, 1990), P. 141.

from classical ulama, namely Ash-Syatibi. Among modern scholars who reject the existence of 'ilmi' interpretations include Sheikh Mahmud Syaltut.⁵⁵ He believes that interpretation must be cleaned from two aspects, namely using verses to strengthen factions or opposing schools of thought, and the use of scientific theory.⁵⁶ Then Amin al-Khuli and Abbas Aqqad from modern circles.⁵⁷

2. Pollination In Science

1. Definition of pollination

Pollination or can also be called pollination, which is a term that comes from English, pollination cf. pollen which means "pollen". This process is the process of pollen falling on the pistil surface⁵⁸. In various types of flowers, this process often "falls on the stigma". Pollination is an important part of the reproductive process of seed plants.⁵⁹



Pollination begins when pollen lands on the stigma and forms a pollen tube that connects the stigma to the ovary. Sperm cells are then transmitted through the tube to the ovaries. Furthermore, fertilization occurs when sperm cells reach the ovaries. After that, the seeds are released from the

⁵⁵ As-Syuyuti, Al-Itqan., P. 34.

⁵⁶ Mutma'innah Dan Junaid, "Plus Minus Tafsir Ilmi", *Indonesian Journal Of Education Research And Technology*, Vol. 2, No. 1, (Januari 2022), P.7.

⁵⁷ Lajnah pentashihan mushaf Qur'an , *Hewan Dalam Perspektif Qur'an Dan Sains* p. xxiv

⁵⁸ Susilawati Dan Bachtiar, N (2018). *Biologi Dasar Terintegrasi (Pdf)* Pekanbaru: Kreasi Edukasi. H. 112. ISBN 978-602-6879-99-8

⁵⁹ Nandy, <https://www.gramedia.com/literasi/penerbukan/>. Accessed on 04 January 2024 at 15.30 WIB.

parent plant and can grow into new plants. With this pollination, the plant's reproductive cycle can continue.⁶⁰

2. Factors that influence pollination

Plant pollination greatly influences the shape of flowers and their reproductive organs. Flower architecture, which includes size, position of reproductive organs, nectar accessibility, flower structure and flowering period, all influence interactions between plants and their pollinators. Faegri and Pijl (1979) stated that, most pollinating agents show specific variations in body size, sensory abilities, foraging behavior and energy sources required. This shows that there is a close relationship between flowering architecture and the type of pollinator.⁶¹

The study of pollination cannot be separated from the study of inflorescence characters and pollinator characters. Inflorescence characters include inflorescence morphology and pollen morphology. Pollinator characteristics include the type of pollinator and its behavior as well as analysis of the reciprocal relationship between plants and their pollinators. Gibernau (1999) in his research on pollination studies of *Philodendron Solimoesense* observed the number of flowers that bloomed in a period. Followed by collecting data on the average number of pollinating insects in each inflorescence along with identifying the type of pollinating insect.⁶²

3. Types and processes of pollination

Pollen can reach the stigma naturally or with human assistance. If it is done naturally, pollen can reach the stigma via wind, animals and water.

⁶⁰ Annisa Medina Sari, "Penyerbukan , Pengertian ,Macam Dan Prosesnya", Faperta Umsu 2023 <https://Faperta.Umsu.Ac.Id/2023/06/19/Penyerbukan-Pengertian-Macam-Dan-Prosesnya/>

⁶¹ Adhitia Pratama., "Studi Polinasi Dan Populasi *Amorphophallus Variabilis* Bi. Di Kawasan Universitas Indonesia, Depok", Skripsi Fakultas Matematika Dan Ilmu Pengetahuan Alam Tahun 2011. p.11

⁶² *Ibid* p. 12.

The intermediary that causes the pollination process to occur is called a pollinator. Pollination can be divided into 2 types, namely:⁶³

a. Based on the origin of the pollen

1) Self-pollination (autogamy)

Autogamy or pollination itself is a process of pollination or the transfer of pollen from the anthers to the stigma. This process typically occurs in the same flower or between different flowers but within the same plant. Usually the pollination process occurs when the flowers have not yet started to bloom or are still closed. This condition is often referred to as closed pollination or cleistogamy. For example, butterfly pea flowers and turi flowers.⁶⁴

2) Neighbor pollination (geitonogamy)

Neighbor pollination is the event of attaching pollen from one flower to the stigma of a flower on the stigma of another flower that is still on the same plant, for example cornflowers.⁶⁵

3) Cross pollination (allogamy)

The third type of pollination is cross pollination or allogamy. This pollination process involves attaching pollen from one flower to the stigma of another flower on another plant of the same type. Therefore, this pollination is often called crossing. For example, crossing red flowers with white flowers can produce red, pink and white flowers.⁶⁶

4) Bastar Pollination

The last type of pollination based on the origin of the pollen is hybrid pollination. This pollination is usually also called hybridogamy, namely the pollination process that occurs when the

⁶³Nandy, <https://www.gamedia.com/literasi/penerbukan/>. Accessed on 04 January 2024 at 15.30 WIB.

⁶⁴Yunita Astria Ningsih “ *Media Pembelajaran Penyerbukan Dan Pembuahan Pada Bunga Sebagai Reproduksi Tumbuhan Menggunakan Augmented Reality*” Skripsi Fakultas Teknik Informatika Universitas Islam Riau 2022 p. 15

⁶⁵*Ibid* p. 16

⁶⁶*Ibid*

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pollen that falls on the stigma comes from flowers of other plants and is of a different type. Or it could also have different properties. For example, pollen from a red-fleshed guava plant falls on the stigma of a white-fleshed guava plant. So, hybrid pollination is the process of attaching pollen from one flower to another flower of a different plant. This can only be done with plants that are still closely related.⁶⁷

b. Based on pollination media

1) Pollination carried by the wind (anemogamy)

There are several characteristics of flowers that are pollinated by the wind, namely that the flowers do not have honey glands and are colorless, the amount of pollen is relatively large and light so it is easier to fly in the wind, the heads are large and the pollen stalks are long and sway easily when blown by the wind. , the pistil of the flower lies outward, hairy and long. Examples of plants whose pollination process uses wind are grass, oil palm, corn and rice.⁶⁸

2) Pollination carried out by animals (zoidiogy)

Usually the animals that act as intermediaries for pollination are insects such as bees or butterflies. However, there are also animals other than insects that can also act as intermediaries for pollination, for example birds, bats and snails. The characteristics of flowers that are pollinated by animals are flowers that have attractively colored crowns, have a fragrant odor, and have honey glands. The slimy pollen can stick to the bodies of animals that land on the flowers. Apart from that, flowers that can undergo this type of pollination also usually have hidden and slimy pistils. Bees, butterflies and beetles will come to suck the honey, then the pollen

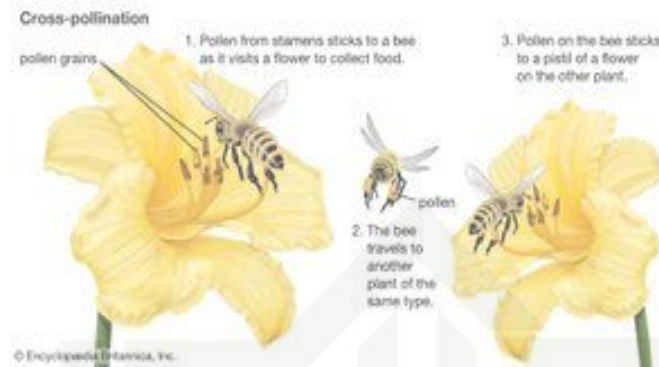
⁶⁷Nandy, <https://www.gramedia.com/literasi/penerbukan/>. Accessed on 04 January 2024 at 15.30 WIB

⁶⁸Annisa Medina Sari, "Penyerbukan , Pengertian ,Macam Dan Prosesnya", Faperta Umsu 2023 <https://faperta.umsu.ac.id/2023/06/19/penyerbukan-pengertian-macam-dan-prosesnya/>

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will stick to the animal's body. When the insect lands again on another flower of the same type, pollination will occur.⁶⁹



3) Pollination by water (hydrogamy)

This type of pollination will occur in plants whose flowers are submerged in water. For example, the Hydrilla plant. The pollination process occurs when pollen is carried by water flow and enters the stigma.⁷⁰

4) Pollination by humans (anthropogamy)

Apart from natural pollination, it turns out there is also pollination carried out manually by humans. For example, snake fruit and vanilla plants. Vanilla and salak flowers have a single sex. So they have male flowers as well as female flowers. To make the pollination process easier, male flowers filled with pollen are picked, then placed on mature female flowers.⁷¹

4. Types of pollination

Pollination is also the basis for the exchange of genetic material (DNA) between plants. The pollination mechanism in almost all flowering plants requires the role of a pollinating agent as a vector. Pollinating agents can be abiotic, for example wind and water, or biotic, namely various types of animals. Most tropical plants interact with animals in the pollination process. In the process of pollination of

⁶⁹Yunita Astria Ningsih " Media Pembelajaran Penyerbukan Dan Pembuahan Pada Bunga Sebagai Reproduksi Tumbuhan Menggunakan Augmented Reality" Skripsi Fakultas Teknik Informatika Universitas Islam Riau 2022 p. 15

⁷⁰Ibid

⁷¹Ibid



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flowering plants, a reciprocal relationship occurs between flowering plants and their pollinators. This interaction is formed if flowering plants can provide something that pollinators need for their survival. Griffin and Sedgley in 1989 stated that, when pollinators obtain many benefits from contact with flowers, which can be in the form of food, shelter and building a nest or place to mate, then this contact can become a permanent part of their life so that there will be constant interaction with them. the plant.⁷²

a. *Abiotic*

This type of abiotic pollination refers to a condition where the pollination process is mediated without the involvement of other organisms. There are only 10% of plants that can be pollinated without help from animals. The form of abiotic pollination or anempholy is usually pollination carried out by the wind. Another type of abiotic pollination is the pollination process that occurs by water. This pollination is also often referred to as hydrophily, which is a pollination process that occurs in aquatic plants which release their pollen directly into the surrounding water.⁷³

b. *Biotics*

In general, the pollination process usually requires a pollinator medium or an organism that can move and carry pollen from the anther to the pistil. This is a type of biotic pollination. The pollination process carried out by insects usually occurs when the plant has developed, has colored petals, and a strong enough aroma to attract insects. Starting from beetles, wasps, bees, and also ants, flies and butterflies.

In zoophilia, the pollination process is carried out by vertebrate animals such as birds and bats, in particular, hummingbirds, sunbirds,

⁷² Adhitia Pratama,. “Studi Polinasi Dan Populasi *Amorphophallus Variabilis* Bi. Di Kawasan Universitas Indonesia, Depok”, Thesis of the Faculty of Mathematics and Natural Sciences 2011. p.12

⁷³ *Ibid*

spiderhunters, honeyeaters, and fruit bats. Plants that are pollinated using bats and moths generally have white petals and a strong aroma.⁷⁴

5. The purpose and benefits of pollination

The purpose of pollination and fertilization of flowers is to multiply plants (species regeneration), to reproduce (increase offspring) and also to maintain the species from its regeneration.

Benefits of pollination and fertilization in flowers. New organisms are formed (regeneration of certain species), agricultural yields increase, economic growth improves, and the number of organisms increases.

B. Literature Review

Before conducting research on plant pollination in the interpretation of the Qur'an and reviews of science, the author will conduct a search for previous research in the form of journals, books and other scientific works related to research, including:

1. Thesis written by Latifa Miranda, student of the Qur'an and Tafsir Study Program, Faculty of Ushuluddin and Religious Studies, Imam Bonjol State Islamic University, Padang 2022⁷⁵ entitled "Reproduksi Tumbuhan Dalam Alquran Dan Natural Sains". The results of this research found that the verses about plants in the Qur'an are expressed with the first word syajar which means tree. Secondly, Atsmara means flowers and fruit. The third is Baql, which means vegetables. The fourth zhara' means gardens and fields. The reproduction of plants in the Qur'an takes place with the help of wind for the pollination process, which is found in QS Al-Hijr verse 22. The correlation between the Qur'an and science regarding plant reproduction is found in the Qur'an surah al-Hijir which explains about plant reproduction through intermediaries Wind is the same as reproduction by generative means, namely reproduction through sexual mating, the fusion of male gamete cells and

⁷⁴Nandy, *Pengertian Penyerbukan Pada Tumbuhan Beserta Prosesnya* <https://www.gramedia.com/literasi/penerbukan/>. Accessed on 04 January 2024 at 15.30 WIB.

⁷⁵ Latifa Miranda, " *Reproduksi Tumbuhan Dalam AlQur'an Dan Natural Sains*" (Padang: Universitas Islam Negeri Imam Bonjol, 2022)

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female gamete cells. This research is different from my research because in this research only discusses plant reproduction only in Surah Al-Hijr verse 22, while in my research discusses plant pollination in Surah Al-Hijr verse 22 and An-Nahl verses 68-69.

2. Thesis written by Fitriyana Hoirunnisa, student of the Qur'an and Tafsir Science Study Program, Faculty of Ushuluddin and Religious Studies, Raden Intan State Islamic University, Lampung 2022⁷⁶ entitled "Penciptaan Tumbuhan Dalam Kajian scientific interpretation ". This research discusses plants in general and understands the process of plant life as stated in the Al-Qur'an, starting from the initial process of plant creation which occurred in the Archaean period or in the Qur'an which occurred in the fifth era which was marked by the presence of water. This was also explained by Sheikh Thanthawi jauhari regarding the beginning of life, in his interpretation he said that life began from a substance that had a jelly-like shape and texture located at the bottom of the sea which was discovered by scientists and was called protoplasm. Based on the explanation above, researchers have not found research regarding pollination in interpretation Al-Qur'an and botany.
3. Journal Written by Fitra Ramdani Ointu, Student of the Madrasah Ibtidaiyah Teacher Education Department entitled "Morfologi Tumbuhan Dalam Perspektif Al Qur'an" 2022.⁷⁷ In this research, we discuss the plants scattered in the verses of the Qur'an , as well as knowing the basics of plant morphology in education, as well as knowing the meaning and importance of protecting nature contained in the verses about plants.
4. Thesis written by Ismi Alifah, Biology Study Program Student, Faculty of Science and Technology, Sunan Gunung Djati State Islamic University, Bandung 2020⁷⁸ entitled "Aktifitas Serangga Pengunjung Bunga Zinnia

⁷⁶ Fitriyana Hoirunnisa, "Penciptaan Tumbuhan Dalam Kajian Tafsir Ilmi" (Lampung: Universitas Islam Negeri Raden Intan, 2022)

⁷⁷ Fitra Ramdani Ointu, "Morfologi Tumbuhan Dalam Perspektif Qur'an ", Tafsir Tarbawi (Juni 2022)

⁷⁸ Ismi Alifah, "Aktivitas Serangga Pengunjung Bunga Zinnia (Zinnia Elegans) Di Kebun Agrowisata Kwt Aisyiyah Cirebon". (Bandung: Uin Sunan Gunung Djati, 2020)

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(*Zinnia Elegans*) Di Kebun Agrowisata KWT Aisyiyah Cirebon". This research discusses the types of visitor insects that are active in *Zinnia* flowers. Then provide information about the morphology (color) of *Zinnia* flowers. This research also provides information regarding the relationship between the activity of insects visiting *Zinnia* plants and environmental factors and the morphology of *Zinnia* flowers. This research shows that the insects that visit *Zinnia* flowers are from the families Apidae, Hesperidae, Nymphalidae, Papilionidae, Pieridae and Syrphidae. Insect visiting activity is influenced by environmental factors such as air humidity, light intensity, temperature and wind speed. Visiting insects are more active in the morning compared to the afternoon or evening. The color of the flowers influences the interest of insects to visit the flowers, of which more often visit the pink *Zinnia* flowers. Based on the study above, I am interested in researching pollination in the Qur'an and botany, because in it I will also discuss pollination with the help of insects, namely bees.

5. Thesis written by A'limna Qurrota A'yun, student of the Qur'an and Tafsir Science Study Program, Faculty of Ushuluddin, Adab and Da'wah, State Islamic Institute (Iain) Ponorogo 2019⁷⁹ entitled "Angin Dalam Perspektif Al Qur'an (Studi Tafsir Tematik)". This research discusses the terms, types and benefits related to wind contained in the Qur'an . This research concludes that wind has various forms, such as in the form of *mufrod ar-rīh* which has a negative meaning while wind in the form of *jama ar-rīyah* has a positive meaning. This study is different from the study that researchers will study, because this research only focuses on wind in the Qur'an .
6. Thesis written by Ferdy Vernando, student of the Department of Qur'an Science and Tafsir, Faculty of Ushuluddin and Islamic Thought, Sunan Kalijaga State Islamic University, Yogyakarta 2019⁸⁰ entitled "Tumbuh Kembang Tumbuhan Menurut Al Qur'an Dan Sains". This research discusses

⁷⁹A'limna Qurrota A'yun, *Angin Dalam Perspektif Al-Qur'an (Studi Tafsir Tematik)*, (Iain Ponorogo, 2019)

⁸⁰Ferdy Vernando, "Tumbuh Kembang Tumbuhan Menurut Al- Qur'an Dan Sains." (Yogyakarta: Uin Sunan Kalijaga 2019)

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the growth and development of plants contained in the Qur'an in several categories, namely the internal factors of seeds described in Surah Al-An'am verse 95 and pollination which is described in Surah Al-Hijr verse 22. And the external factor is rain which is described in several verses, one of which is in surah al-hajj verse 5 and sunlight is described in several surahs, one of which is surah ar-rahman verse 6. So by comparing science and the Qur'an it results in the conclusion that there is a correlation between science and the Qur'an when talk about plant growth and development problems. This research is different from my research because in this research only talks about plant growth and development in the Qur'an and science, while in my research what is discussed is about plant pollination in the Qur'an and botany. .

7. Thesis Written by Hayatul Husni, student of Ulumul Qur'an and Ulumul Hadith Concentration, Islamic Religious Studies Study Program, Institute of Qur'an Sciences (Iiq) Jakarta 2017⁸¹ Entitled "Morfologi Tumbuhan Menurut Perspektif Al Qur'an (Kajian Terhadap Tafsir Thantawi Jauhari)". This research discusses the interpretation of Thantawî Jauharî in interpreting the verses of the Qur'an which mention Plant Morphology through his work al Jawâhir fî Tafsîr Al-Qur'ân al Karîm. In his thesis the author also stated that Thantawijauhari's interpretation of plant morphology consisting of roots, stems, leaves, flowers and fruit is still in accordance with current scientific theory but is not yet complete due to the development of science and technology and continuous research is carried out resulting in findings - new findings. This research is different from the research that I want to research because this research only focuses on the morphology or shape of plants, whereas what the researchers want to study is discussing pollination which is found in the interpretation of the Qur'an and botany.
8. Thesis written by Rini Andini, student of the Department of Qur'an Science and Tafsir, Faculty of Ushuluddin Adab and Da'wah Iain Syekh Nurjati Cirebon 2016, entitled "Penafsiran Ayat- Ayat Tentang Tumbuhan Dalam

⁸¹Hayatul Husni, 'Morfologi Tumbuhan Menurut Perspektif Al- Qur' An, Tesis, (Jakarta: Institut Ilmu AlQur'an , 2017), <https://Ejournal.Unib.Ac.Id>

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Tafsir Ilmi Kemenag RI”⁸². This research discusses the interpretation in the Ministry of Religion's scientific interpretation of plant verses, in which explanations are given about the functions and benefits of plants, plant life processes, the nature and role of plants, both from the interpretation of the Qur'an and from the perspective of scientific theory. Therefore, researchers are interested in examining one of the discussions regarding plants, namely pollination in the interpretation of the Qur'an and botany.

9. Ilmi Tafsir book entitled “Tumbuhan Dalam Perspektif Al Qur'an Dan Sains”. Researchers only focus on discussions about plants in the Qur'an .⁸³
10. Journal Written by Ojak Manurung, Doctoral Program Student, North Sumatra State Islamic University, Medan 2017, entitled "Pengetahuan Biologi Dalam Al Qur'an "⁸⁴. This journal discusses the term biological knowledge that is not found in the verses of the Qur'an . However, there are many verses related to biological knowledge. Biology is a science that studies living things. And the objects of study are humans, animals and plants. By studying the verses related to biological knowledge, it is clear that in the Qur'an there are no verses that hinder the progress of science, but on the contrary encourage further progress.

Apart from the research described above, there are still several similar studies in the form of theses and other journal articles. Of the previous scientific works described above, no work has been found that specifically examines the pollination process in the Qur'an and botany in terms of scientific interpretation. So, from here we can see the differences and uniqueness of this research and previous scientific works.

⁸²Rini Andini, “*Penafsiran Ayat-Ayat Tentang Tumbuhan Dalam Tafsir Ilmi Kemenag RI*,” (Iain Syekh Nurjati Cirebon, 2016)

⁸³Lajnah Pentashihan Mushaf Al-Qur'an Badan Litbang Dan Diklat Kementerian Agama RI Dan Lembaga Ilmu Pengetahuan Indonesia (LIPI), *Tumbuhan Dalam Perspektif Qur'an Dan Sains*, Cet.1, Syawal 1432 H/ September 2011

⁸⁴Ojak Manurung, “*Pengetahuan Biologi Dalam AlQur'an* ”, Jurnal Waraqat, Vol II No. 1, (Januari- Juni 2017)

CHAPTER V CLOSING

A. Conclusion

Based on the presentation of the results of the discussion and analysis of verses regarding the process of plant pollination in the interpretation of the Qur'an and its relevance to botany, the following conclusions can be drawn:

1. Plant pollination in the Qur'an is explained in two letters, namely al-hijr verse 22 and an-nahl verses 68-69. First, in Surah Al-Hijr verse 22, the mufassir interpret that the wind helps the pollination process of plants, where the wind functions as an intermediary for pollen to fall on the stigma. Second, in Surah An- Nahl verses 68-69, the commentators also interpret that the pollination process is also carried out with the help of animals or more specifically bees, where the pollination process occurs when the bee moves from one flower to another and at that time the pollen The pollen that sticks to the bee will stay on other flowers when the bee moves.
2. The content of the verses in the Qur'an which are explained in more detail through interpretation are always relevant to the study of botany, including plant pollination. The first is about the wind that breeds plants. Science through its scientific research confirms that there is such a thing as wind-assisted marriage or known as anemogamy. Second, science also explains about plant mating carried out with the help of animals or known as zoidiogamy.

B. Suggestion

There are many verses in the Qur'an that discuss plants and various terms. In this research the author discusses only surface research regarding plants, there are still many wonders of the Qur'an that the author has not revealed through this work. This research only takes one aspect of the plant life process, namely pollination. Therefore, the author hopes that there will be more impressive research to reveal the features of plants as evidence of the Kauniyah verse of

Allah SWT. And by saying thank God for His grace that has been given to the author so that this research can be completed according to the planned time. The author also realizes that there are still shortcomings both in terms of content and methodology. Therefore, constructive criticism and suggestions are highly expected for the author. The author also hopes that this work can be utilized by students at UIN Sultan Syarif Kasim Riau, especially students at the Ushuluddin Faculty, Department of Qur'an and Tafsir Sciences.

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BIBLIOGRAPHY

- Abd al-Rahman, Shaikh Khalid. *Ushul al-Tafsir wa Qawaiduh* Beirut: Dar anNafais, 1986
- Abdul Sattar Al-Miliji, Sayyed, *Ilmu An-Nabât Fî Al-Qur"Ân Al-Karîm*, (Kairo : Al Hay'Ah Al- Mishriyyah Al-Ammah Li Al-Kitâb, 2005)
- Abdullah Bin Muhammad, dkk. (2008). *Tafsir IbnuKatsir* jilid 7. Jakarta :Pustaka Imam Syafi'i.
- Ackerman JD. *Serbuk sari abiotik dan penyerbukan: perspektif ekologi, fungsional, dan evolusi. Sistematika dan Evolusi Tumbuhan*. 2000.
- Alifah, Ismi. "Aktivitas Serangga Pengunjung Bunga Zinnia (*Zinnia Elegans*) Di Kebun Agrowisata Kwt Aisyiyah Cirebon". Skripsi Fakultas Sains Dan Teknologi Uin Sunan Gunung Djati Bandung 2020.
- Amrullah, Abdul Malik Abdulkarim, *Tafsir al-Azhar*. Jakarta: Pustaka Panjimas.
- Ardiansyah, Reza, Dkk, "Botani", Widina Media Utama: 2023
- Arifin, M. Anugrah, *Islam dan Sains paradigm Integrasi*. Yogyakarta: CV. Budika Utama, 2018.
- Arni, Jani. 2013. *Metode Penelitian Tafsir*. Pekanbaru: Daulat Riau.
- Bachtiar, Susilawati, N. (2018). *Biologi Dasar Terintegrasi (PDF)*. Pekanbaru: Kreasi Edukasi. ISBN 978-602-6879-99-8.
- Baidan, Nasrhuudin. 2012. *Metodologi Penafsiran Qur'an*, (Yogyakarta: Pustaka Pelajar.
- Charisma, Moh. Chadziq. 1991. *Tiga Aspek Kemukjizatan Qur'an* Surabaya: PT. Bina Ilmu.
- Darraz, Abdullah. *Al-Naba' Al-'Azhim*. Mesir: Tatbha'ah Al-Sa'adah, 1960.
- Dedi M. Rachmandan Wawa Wibawa. (2007) *Inti Sari Biologi*. Bandung: PustakaSetia.
- Departemen Agama RI, *Qur'an dan Tafsirnya*. Jakarta: Lentera Hati, 2010.
- Departemen Agama RI. *Qur'an Dan Tafsirnya* (Edisi Yang Disempurnakan). (Jakarta: Widya Cahya, 2011)
- Dimiyati, 'Afifuddin, *Shamil fi Balaghah Al-Qur'an* . Malang: Lisan Arabi, 2018.

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- _____, Muhammad Husain. *at-Tafsîr wa al-Mufasssirûn*, jilid 2. Kairo: Dâr al-Hadîts, 2005.
- Farmawi, Abd. Al-Hayy, 1996. *Al-Bidayah fi al-Tafsir al-Mawdhu'iy: Dirasah Manhajiah Mawdhu'iyah, alih bahasa Suryan A. Jamrah*. Jakarta: Raja Grafindo.
- Fatimah, *Ayat Ayat Sains Dalam Al- Qur'an (Telaah Balaghah)*. Al- Hikmah.Vol. 5 Tahun 2017.
- Fitria Mawarti, Tesa 2022, *Tafsir Saintifik*, Universitas Islam Negeri Antasari Banjarmasin.
- Friedman J, Barrett SCH. *Analisis filogenetik evolusi penyerbukan angin pada tumbuhan berbiji tertutup*. Jurnal Internasional Ilmu Tanaman. 2008.
- Ghazali. *Ihya 'Ulum Al-Din*, jilid I. Kairo: Al-Tsaqafah AlIslamiyah, 1365.
- Ghulsyani , Mahdi, *Filsafat Sains Menurut Al-Qur'an* Badung: Mizan, 1990
- Hanafi, Hasan. *Tafsir & Kemaslahatan Umat* yogyakarta:Nawesea Press, 2007.
- <https://P2k.Stekom.Ac.Id/Ensiklopedia/Botani>
- <https://www.britannica.com/science/pollination/Mechanisms-that-prevent-self-pollination>
- [https://Www.Gramedia.Com/Literasi/Penyerbukan/.](https://Www.Gramedia.Com/Literasi/Penyerbukan/)
- <https://TafsiralQur'an.Id/Tafsir-Ilmisurah-Alhijr-Ayat-22-Tentang-Penyerbukan-Tumbuhan-Melalui-Angin>
- <https://Www.Kompas.Com/Skola/Read/2021/07/05/163643469/Macam-Macam-Penyerbukan-Berdasarkan-Perantaranya>
- https://Www.Datik.Com/Edu/Datikpedia/D-6302180/Mengenal-Ilmu-Botani-Dan-Cabang-Cabangnya#Google_Vignette
- Husein Mahran, Jamâl Ad-Dîn. *An-Nabatât Fî Al-Qur"Ân Al Karîm*, (Kairo : Kementrian Wakaf Mesir, 2000)
- Husni, Hayatul. 2017.*Morfologi Tumbuhan Menurut Perspektif Al-Qur'an* , Tesis, 2.4

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- Iskandar, Delik dkk. *Jelajah Ilmu Pengetahuan*. Semarang: CV. Aneka Ilmu, 2010.
- Jauhari, Tantawi. *al-Jawahir fi Tafsir Qur'an al-Karim* jilid 8. Mesir: Mustafa al-Baby al-Halaby wa Awladuhu, 1929.1983.
- Kathier, Ibnu. *Tafsir Ibnu Kathier* jilid 5 terj. Abdul Ghoffar, Abdurrahim Mu'thi. Bogor: Pustaka Imam ash-Shafi'i, 2003.
- Kementrian Agama. 2012. *Tafsir Ilmi Tumbuhan Dalam Perspektif Qur'an Dan Sains*. Jakarta: Lajnah Pentashihan Mushaf Qur'an
- Khaeruman, Badri. *Sejarah Perkembangan Tafsir Qur'an* . Bandung: Pustaka Setia, 2004.
- Lajnah Pentashihan Mushaf Qur'an Badan Litbang Dan Diklat Kementerian Agama RI Dan Lembaga Ilmu Pengetahuan Indonesia (LIPI), *Tumbuhan Dalam Perspektif Qur'an Dan Sains*, Cet.1, Syawal 1432 H/ September 2011 M
- Lajnah Pentashihan Mushaf Qur'an . *Hewan dalam Perspektif Qur'an dan Sains*. Jakarta: Lajnah Pentashihan Mushaf Qur'an , 2012
- Lajnah Pentashihan Mushaf Qur'an Kemenag RI, *Pelestarian Lingkungan Hidup, Tafsir Qur'an Tematik*, Jakarta : Lajnah Pentashihan Mushaf Qur'an , 2009.
- Lesikah, "Pembangunan Game Simulasi Perkembangan Vegetatif Buatan Pada Tumbuhan Berbasis Desktop". Skripsi Fakultas Teknik Dan Ilmu Komputer Universitas Komputer Indonesia 2014.
- Muhtasib, Abdul Majid Abdussalam. *Visi dan Paradigma Tafsir Qur'an Kontemporer Bangil* : Al Izzah, 1997
- Munawir, Ahmad Warson. *Al-Munawir Kamus Arab-Indonesia*, Yogyakarta: Pustaka Progresif, 1999.
- Mutma'innah Dan Junaid, "Plus Minus Tafsir Ilmi", *Indonesian Journal Of Education Research And Technology*, Vol. 2, No. 1, Januari 2022.
- Nadir Darwis, Muhammad, *Ijizal Ilmiah Lil – Qur'an Wa Sunnah Wa Shilatuhu Bimanhaj Da'Wah Al – Islamiah*, Maktabah Al- Iman Kairo 2011 M – 1432 H



Hak Cipta Dilindungi Undang-Undang

- Najjar, Dr. Dzaglul. *Al- Ardu Fil Qur'an Al- Karim* Maktabah Al- Ma'Rifah Bairut. Cetakan Pertama 1426 H.
- Ningsih, Yunita Astria “ *Media Pembelajaran Penyerbukan Dan Pembuahan Pada Bunga Sebagai Reproduksi Tumbuhan Menggunakan Augmented Reality*” Skripsi Fakultas Teknik Informatika Universitas Islam Riau 2022.
- Pratama, Adhitia. “*Studi Polinasi Dan Populasi Amorphophallus Variabilis Bi. Di Kawasan Universitas Indonesia, Depok*”, Skripsi Fakultas Matematika Dan Ilmu Pengetahuan Alam Tahun 2011
- Putri Maydi Arafatun Anhar, Imran Sadewo, M. Khoirul Hadi Al-Asy Ari. 2018. Studi Metode Penafsiran Berbasis Ilmu Pengetahuan Pada Tafsir Kemenag. *Prosiding Konferensi Integrasi Interkoneksi Islam dan Sains*, Qurrota A'yun, A'limna, *Angin dalam Perspektif Qur'an (Studi Tafsir Tematik)*, Skripsi Fakultas Ushuluddin Iain Ponorogo 2019.
- Qutub, Sayyid, *Tafsir fi Zhilalil Qur'an* . Beirut: Darusy Syuruq, 1992.
- Rafika Elsa Oktaviani, Dkk.(2020) *Pemahaman Konsep Guru Dan Calon Guru Tentang Integrasi SainsIslam Pada Materi Reproduksi Pada Tumbuhan*”, Jurnal Basicedu Volume 4 Nomor 1.
- Ramadhani Dkk. 2016. *Qur'an vs Sains Modern Menurut Zakir Naik*. Jakarta: Sketsa
- Razi, Fakhruddin. 1990. *Mafatih al-Ghaib*. Jilid 10. Beirut: Dar al-Kutub al- Ilmiyah.
- Rismunandar. 1986. *Berwiraswasta dengan Beternak Lebah*. Bandung: Sinar Baru.
- Rosadisastra, Andi. 2007. *Metode Tafsir Ayat-ayat Sains dan Sosial*. Jakarta: AMZAH.
- Rosanti, Dewi. 2013. *Morfologi Tumbuhan*. Jakarta: Erlangga.
- Rosidi, Imron. *Fenomena Flora & Fauna dalam Al-Qur'an*, Malang: UIN Maliki P'rss, 2014.
- Saha, M. Isom, Saiful Hadi. 2005. *Sketsa Qur'an* . Jakarta: Lista Fariska Putra.
- Setiowati Tetty Dan Deswaty Furqonita. 2007. *Biologi Interaktif untuk SMA/MA*. Jakarta: Azka Press.

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- Shihab, M. Quraish, Dkk. 2007. *Ensiklopedia al-Qur'an (Kajian Kosa Kata)*, Jakarta: Lentera Hati.
- _____. 2002. *Tafsir al-Misbah*. Jakarta: Lentera Hati.
- _____. 2007. *Membumikan Qur'an : Fungsi dan Peran Wahyu dalam Kehidupan Masyarakat*. Bandung: PT.Mizan Pustaka.
- Sugiyono. 2007. *Metode Penelitian Kuantitatif Kualitatif*. Bandung: Alfabeta.
- _____. 2011. *Metode Penelitian Kuantitatif, Kualitatif Dan R&D*. Bandung: Alfabeta.
- Sutrian, Yayan. 2011. *Pengantar Anatomi Tumbuhan*. Jakarta: PT. Rineka Cipta.
- Syauci Ibrahim, Ahmad. 2014. *Ensiklopedia Mukjizat Ilmiah Hadist Nabawi*. Cetakan Kedua. PT S yigma Examedia Arkanleema – Syaamil Books.
- Syuyuti, Jalaluddin. *Al-Itqan Fii Ulum Al- Qur'an*, (Beirut: Dar Al Fikr, 2008)
- Tim Penyusun Pedoman Penyusunan Dan Penulisan Skripsi Fakultas Ushuluddin Universitas Islam Negeri Sultan Syarif Kasim Riau. 2021. *Pedoman Penyusunan Dan Penulisan Skripsi*. Pekanbaru: Fakultas Ushuluddin.
- Universitas Lampung Vol. 1 . 2015. *Reproduksi Tumbuhan*.
- Vernando, Ferdy. “*Tumbuh Kembang Tumbuhan Menurut Qur'an Dan Sains.*” Skripsi Fakultas Ushuluddin Uin Sunan Kalijaga Yogyakarta 2019.
- Yahya, Harun. *Ensiklopedia Mukjizat Ilmiah Al- Qur'an Dan Hadist*, Cetakan Kedua, Agustus 2014 M, PT Syigma Examedia Arkanleema, Syaamil Books
- Qardhawi, Yusuf, *Kaifa Nata'amal Al-Qur'an Al- Adzim* Cairo: Dar Asy- Syuruq, 2000.
- Zulaiha, eni. *Tafsir Kontemporer: Metodologi, Paradigma dan Standar Validasinya*, wawasan: jurnal ilmiah Agama dan Sosial Budaya 2.1 2017.

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PERSONAL IDENTITY



PROFILE

Name : Dwi Angraini
 Place of Birth and Date : Kampar, 1 Oktober 2001
 Gender : Female
 Student Number : 12030223816
 Semester : VIII
 Religion : Islam
 Status : Unmarried
 Address : Jl. M. Ali Gg. Suka maju, Desa Perawang Barat, Kec. Tualang, Kab. Siak, Riau
 Mobile Phone Number : 0823-8169-1940

PARENTS NAME

Father : Syofianto
 Mother : Asma Hayani
 Address : Jl. M. Ali Gg. Suka maju, Desa Perawang Barat, Kec. Tualang, Kab. Siak, Riau

EDUCATIONAL BACKGROUND

- 2007-2008 : Kindergarten Ummi Kaltsum
- 2008-2014 : Elementary School 006 Tualang
- 2014-2017 : Madrasah Tsanawiyah Islamic centre al-Hidayah Kampar.
- 2017-2020 : Madrasah Aliyah Islamic centre al- Hidayah Kampar.
- 2020-2024 : State Islamic University of Sultan Syarif Kasim Riau

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