Frogs in the Quran and Science: Ecological Interpretation and Straightening of Mystical Meanings in Muslim

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Abstract

This article examines frogs from the perspective of the Quran and science through an ecological interpretation approach. This study is important because frogs are not only understood as part of biodiversity but are also often associated with various mystical understandings in society, particularly regarding frog sounds and natural phenomena. This research uses a library study method with a thematic interpretation approach (*maudhu'i*), drawing on Qur'anic, hadith, and scientific literature on frog behaviour. The results show that frogs play an ecological role in maintaining the balance of nature (*mīzān*), including serving as natural predators, participating in the food chain, and functioning as environmental bioindicators. The prohibition on killing and consuming frogs in the hadith not only has a sharia legal dimension but also reflects biological and ecological wisdom, as frogs can carry pathogenic microorganisms, parasites, and toxins that can harm human health if consumed. Furthermore, frog sounds, which are often interpreted mystically by society, are essentially a form of biological communication that influences environmental conditions, especially humidity and the rainy season. The integration of Islam and science in this study helps clarify the community's understanding of superstitious elements and strengthens ecological awareness grounded in the values of monotheism.

Keywords: Bioindicators; Frogs; Islamic Studies; Science; Mystical Meaning.

Abstrak

Artikel ini mengkaji tentang katak dalam perspektif Al-Qur'an dan sains melalui pendekatan tafsir ekologis. Kajian ini penting dilakukan karena katak tidak hanya dipahami sebagai bagian dari keanekaragaman hayati, tetapi juga sering dikaitkan dengan berbagai pemaknaan mistis di masyarakat, khususnya terkait suara katak dan fenomena alam. Penelitian ini menggunakan metode studi kepustakaan (*library research*) dengan pendekatan tafsir tematik (*maudhu'i*) melalui kajian ayat Al-Qur'an, hadis, kitab tafsir, serta literatur ilmiah mengenai ekologi dan perilaku katak. Hasil kajian menunjukkan bahwa katak memiliki fungsi ekologis dalam menjaga keseimbangan alam (*mīzān*), antara lain sebagai predator alami, bagian dari rantai makanan dan bioindikator lingkungan yang sensitif terhadap perubahan ekosistem. Larangan membunuh serta mengkonsumsi katak dalam hadis tidak hanya memiliki dimensi hukum syariat, tetapi juga mengandung hikmah biologis dan ekologis karena katak berpotensi membawa mikroorganisme patogen, parasit, serta toksin yang dapat membahayakan kesehatan manusia apabila dikonsumsi. Selain itu, suara katak yang sering dimaknai secara mistis oleh masyarakat pada dasarnya merupakan bentuk komunikasi biologis yang dipengaruhi kondisi lingkungan, terutama kelembaban dan musim hujan. Integrasi Islam dan sains dalam kajian ini mampu meluruskan pemahaman masyarakat dari unsur takhayul sekaligus memperkuat kesadaran ekologis berbasis nilai-nilai tauhid.

Kata kunci: Al-Quran; Bioindikator; Katak; Pemaknaan Mistis; Studi Islam dan Sains.

A. Introduction

Indonesia is an archipelagic country that has a large area with a tropical climate. Indonesia is known to have the highest Mega-biodiversity after Brazil because it has a wide range of organisms across its various regions, including flora and fauna[1]. One group of fauna with significant diversity is amphibians, specifically the Order Anura (frogs and toads), which are widespread across terrestrial and aquatic ecosystems. Amphibians are animals that have two life forms and two life phases: they can live in water in the larval phase with a respiratory apparatus of gills, then undergo metamorphosis into adults that live on land with a respiratory apparatus of lungs and skin[2].

Frogs are wildlife that have an important role in ecosystems, especially in the food chain. In addition, frogs also serve as bioindicators that are highly sensitive to environmental changes. The presence and condition of frog populations can provide important information

[1] Tina Safaria Nilawati, Hernawati, and Reza Ahmad Taufik, "Habitat and Population Characteristics of the Endemic Java Tree Frog (*Rhacophorus Margaritifer*) in Ranca Upas, West Java, Indonesia," *Biodiversitas* 20, no. 6 (2021): 1644–49, https://doi.org/10.13057/biodiv/d200621.

[2] Desy Natalia Sitorus, Rizki Kurnia Tohir, and Dita Trifani, "Pengamatan Aktivitas Harian Dan Waktu Aktif Katak Pohon Bergaris (*Polypedates Leucomystax*)," *Fakultas Kehutanan* 1, no. 1 (2024): 1–12.

about ecosystem quality, including pollution levels and climate change. A decline in frog populations could be an early indicator of broader environmental problems. Frog behaviour is already a subject of scientific research, including the identification of frogs' interactions with the environment, reproductive strategies, and their role in the ecosystem's food chain. In addition, frogs are also considered bioindicators of environmental health due to their sensitivity to environmental changes[3].

However, in society, especially within agrarian and religious cultures, frogs are understood not only as biological creatures but also as symbols and mystics. The sound of frogs, for example, is often associated with omens, such as the arrival of rain, or even with supernatural phenomena. This meaning indicates that a socio-cultural construct develops from generation-to-generation and is not necessarily in line with scientific understanding or Islamic teachings[4]. Based on an Islamic perspective, all living things, including frogs, are the creation of Allah *SWT*, which have their own functions and roles in maintaining the balance of nature. The Quran emphasises that all creatures are blessed by Him, and that the existence of animals should not be interpreted mystically, as this deviates from the value of monotheism. Thus, an integrative approach that integrates science and the interpretation of the Quran is needed to clarify people's understanding of natural phenomena, including those related to frogs[5].

This phenomenon shows that frogs are not merely objects of natural science research, but also possess profound social, cultural, and religious dimensions that shape public perception. Global ethnozoological studies have documented the complex relationship between humans and amphibians across various cultures. In European and Slavic traditions, frogs are symbolically associated with fertility, rain-bringing rituals, and even religious syncretism [6]. The Indigenous Yolngu community of Australia regards the frog (*Garkman*) as a vital spiritual totem representing the wet season and ecological renewal[7]. Meanwhile, among West African ethnic groups, frogs and toads are widely used in traditional medicinal practices and dietary [8]. However, existing literature has predominantly examined frogs through isolated lenses—focusing either on pure biological ecology or localized cultural folklore. Consequently, studies that integratively bridge Islamic theological perspectives—specifically through an ecological interpretation of the Quran and Hadith—with modern scientific insights on amphibian ecology remain notably sparse[9].

From an Islamic perspective, frogs are among the creatures created by Allah SWT, each with specific functions and wisdom within the life system. The Quran emphasises that

[3] Sitorus, Tohir, and Trifani.

[4] Lina Marliana Hidayat, "Simbolisme Katak Dalam Upacara Meminta Hujan Babangkongan Di Desa Surawangi Kabupaten Majalengka," 2021, 414–25.

[5] Patra I. Latif, "Tafsir Tarbawi : Informasi Al-Qur'an Tentang Binatang," *Jurusan Pendidikan Guru Madrasah Ibtidaiyah* 2, no. 4 (2022).

[6] Pallua, "What Can the Mythical Frog Tell Us? The Symbolism and Role of the Frog in History and Modernity."

[7] Boll, "Following Garkman , the Frog , in North Eastern Arnhem Land (Australia)."

[8] Mohneke, Onadeko, and Rödel, "Medicinal and Dietary Uses of Amphibians in Burkina Faso."

[9] Latif.

all living things are signs of the greatness of Allah SWT and that they should always pray to Him in accordance with His decrees. In addition, the hadith of the Prophet Muhammad (*saw*), which prohibits the killing of frogs, indicates the existence of ethical values and respect for the existence of living beings[10]. However, the limitations of studies linking Islamic sources to scientific knowledge often mean that the public's understanding of frogs remains influenced by mystical beliefs lacking adequate scientific or theological bases.

Based on this, the study of frogs from the perspective of the Quran and science is important, not only to reveal their ecological role, but also to examine and straighten out the mystical meanings that develop in Muslim society. The ecological interpretation approach is expected to be able to provide a more comprehensive understanding, so as to create harmony between scientific knowledge, Islamic values, and social practices of the community.

B. Research Methods

This research uses the library research method. The research focuses on an integrative study of frogs from the perspectives of the Quran, hadith, and modern science. Research data were obtained from various relevant sources, including verses of the Quran, hadith of the Prophet (Muhammad saw), books of interpretation, books, scientific articles, and research findings that discuss ecology, behaviour, and the role of frogs in ecosystems.

The approach used in this study is thematic interpretation (*maudhu'i*) and ecological interpretation, which is an approach that comprehensively collects and studies Quranic verses related to specific themes. In this study, verses related to frogs, animals, the environment, and the relationship between humans and nature are collected and analysed in light of the *mufasir*'s context and interpretation. In addition, hadiths related to frogs are studied to gain a more complete understanding of the Islamic view of their existence and status.

Data collection was carried out through documentation studies by tracing various primary and secondary sources. The primary data for the study include Quranic verses related to animals and frogs, especially Q.S. al-An'am/6:38, Q.S. al-A'raf/7:133, and Q.S. al-Isra'/17:44, as well as hadiths prohibiting the killing of frogs. Secondary data include tafsir books, Islamic environmental ethics literature, anthropological and cultural studies on frog symbolism, and biology articles on ecology, behaviour, bioindicators, and the health risks of consuming amphibians.

The analysis was carried out through four stages: identification of relevant religious texts; exploring the meaning of interpretation and its social context; synthesis of biological findings regarding the ecological function and behaviour of frogs; and interpretive integration to assess how understanding Islam and science can straighten mystical meanings and strengthen the ecological consciousness of Muslim communities. The validity of the data is established through triangulation of sources by comparing information obtained from the Quran, hadith, books of interpretation, and contemporary scientific literature.

[10] Sayed Abubaker Hashimi, "Animal Rights in Islamic Law," *Journal of Sciences-Kabul University* 2, no. 5 (2021): 155–69, https://doi.org/https://doi.org/10.62810/jss.v7i4.178.

C. Results and Discussion

The study of frog behaviour can be linked to an Islamic perspective through the concept of human obligations as caliphs or guardians of nature. In this context, research on frog behaviour not only supports a scientific understanding of frogs' ecological functions but also underscores humans' responsibility to protect and manage nature wisely. This understanding aligns with Islamic teachings on the importance of maintaining the balance of nature (*mizan*) and treating Allah's creatures with respect and concern. This concept is in line with the principle of animal rights in Islam, which regards animals as creatures created by Allah SWT and must be treated with kindness and compassion[11].

Frogs based on the Perspective of the Quran and Society

Based on an Islamic perspective, humans are not only users of nature but also guardians of the balance of life, including animals. Any form of action that can hurt, torture, or harm animals for no reason justified by the *sharia* is strictly prohibited. This principle shows that Islam teaches the value of protecting animals as part of human moral and ethical responsibility in protecting the creation of Allah SWT [12].

1. Frogs as Part of the Community of Living Beings (Q.S. al-An'am: 38)

The Quran teaches that Allah SWT created all creatures with a clear purpose, including frogs as part of the biodiversity that must be maintained. As explained in Q.S. al-An'am/6: 38.

وَمَا مِنْ دَاۤبَّةٍ فِى الْاَرْضِ وَلَا طٰۤىِٕرٍ يَّطِيْرُ بِجَنَاحَيْهِ اِلَّآ اُمَمٌ اَمْثَالُكُمْ ۗمَا فَرَّطْنَا فِى الْكِتٰبِ مِنْ شَيْءٍ ثُمَّ اِلٰى رَبِّهِمْ يُحْشَرُوْنَ

Translation:
"And there is no creature on (or within) the earth or bird that flies with its wings except [that they are] communities like you. We have not neglected in the Register a thing. Then unto their Lord they will be gathered"

This verse explains that Allah SWT controls all things, His knowledge encompasses all existing creatures, and He is the one who rules the universe. According to Ibn 'Abbas, what is meant by "*al-kitab*" in this verse is "*Ummul Kitab*". Because the meaning of this verse, according to him, is that everything that creeps on the surface of the earth, everything that flies in the air, everything that lives in the oceans, from the smallest to the greatest, from the visible to the hidden, He alone creates, develops, arranges and maintains them. The creatures of Allah SWT who live in this world are not limited to humans; there are many other kinds and varieties of creatures. In fact, there are still many things that humans do not

[11] Hashimi.
[12] Hashimi.

know. All of them submit and submit themselves to God, follow His commandments and stop His prohibitions[13].

This verse does not mention frogs directly, but provides a theological basis for seeing animals as a people/community of creatures, and is closely related to the concept of *animal rights* in Islam, which affirms that every animal has the right to live and receive good treatment from humans. In Islamic teachings, animals are seen as creatures created by Allah SWT, who also blesses Him, so humans are prohibited from hurting, torturing, or killing animals without a reason justified by the *sharia*. The Prophet Muhammad *saw* also set an example through a compassionate attitude towards animals and emphasised the importance of maintaining the welfare of living beings. The existence of frogs in the ecosystem has not only ecological value but also moral and spiritual value that must be respected and maintained by humans[14].

Through the existence and behaviour of animals, humans are invited to reflect on the signs of Allah SWT's greatness and power in creating the universe in an orderly and balanced manner. In addition, animals are a means of learning for humans in carrying out their duties as obedient servants to Allah SWT, as well as caliphs responsible for preserving the earth. Various animal behaviours, such as adaptability, sustaining life, and maintaining ecosystem balance, show that all of God's creation has a certain function and wisdom in life[15].

Many of God's creations can be seen directly around with their abundance of benefits. Allah SWT sends down rain, and, with rainwater, life is created, with various kinds of plant growth that humans and animals use as a source of life. In puddles created by rainfall, various types of animals can also breed, for example, frogs, which, when they are still in the form of larvae, can live in water with a respiratory system in the form of gills, and then can live on land in adulthood by using the lungs as a breathing apparatus[16]. Ecologically, frogs have an important role in maintaining environmental balance and ecosystem sustainability. Frogs serve as natural controllers of insect populations, helping maintain food chain stability and reducing potential environmental disturbances caused by pest population explosions. In addition, frogs are also known as bioindicators that are sensitive to changes in environmental conditions, especially water quality and pollution levels. The existence or decline of frog populations can be a marker of ecosystem conditions in an area. This shows that the creation of frogs is not meaningless but has certain wisdom and functions within the life system, which has been regulated in a balanced manner by Allah SWT[17].

[13] Muhammad Amanullah, "Animal Ethics: An Islamic Perspective," no. 2 (2022): 57–66.

[14] Hashimi, "Animal Rights in Islamic Law."

[15] Syarif Hidayat Amrullah, *Etologi: Ilmu Perilaku Hewan*, ed. Dirhamzah, I (Makassar: Tohar Media, 2024).

[16] Latif, "Tafsir Tarbawi : Informasi Al-Qur'an Tentang Binatang."

[17] Donan Satria Yudha et al., "Keanekaragaman Katak Dan Kodok (Amphibia: Anura) Di Suaka Margasatwa Paliyan, Gunungkidul, Yogyakarta Frog and Toad Diversity (Amphibia: Anura) in Paliyan Wildlife Sanctuary, Gunungkidul, Yogyakarta," *Jurnal Biologi Udayana* 23(2), no. 2 (2021): 59–67.

2. The Ethics of Killing Frogs in Islam

The frog in Arabic is /*dhifda'*. Frogs are among the many types of animals mentioned in the Quran and offer many benefits. However, frogs cannot be killed and consumed without *sharia* reasons. One of the hadiths on which the discussion is based was narrated by Abu Dawud from Abdurrahman bin Uthman *r.a.*, namely: عدفض

> "Muhammad bin Kasir narrated to us, narrated to us Sufyan, from Ibn Abi Zibi from Said bin Khalid, from Sayyid bin Musayyib, from Abdurrahman bin Uthman *ra*: A physician asked the Messenger of Allah (Muhammad *saw*) about the frog that was used as medicine, so the Messenger of Allah (Muhammad *saw*) forbade killing it" (HR. Abu Dawud No. 3871; also narrated by An-Nasa'i No. 4357). A number of hadith scholars, such as Al-Hakim and An-Nawawi, consider this hadith to be used as an argument for determining the law regarding frogs.

Based on the hadith, the majority of scholars from the Shafi'i, Maliki, and Hanbali schools are of the opinion that frogs are *haram* for consumption because of the prohibition on killing these animals. According to al-Mundziri, the hadith regarding the prohibition of killing frogs is understood not only as a prohibition on harming the animal but also as the basis for the haram of consuming frogs. This opinion is reinforced by Ali Al-Qari in *Mirqotul Mafatih Syarah Misykatul Mashabih*, who explains that the prohibition on killing frogs reflects a certain honour for the animal in Islamic law. The majority of scholars cite the hadith as evidence for the prohibition on eating frogs. This prohibition also reflects the ethical values and compassion for living beings in Islamic teachings. Animals should not be killed without a reason justified by the *sharia*, such as for halal food needs, maintaining safety, or certain emergency conditions. Although there are differences in the details of the arguments among the *fuqaha*, the dominant view places frogs as animals that should not be killed without a justified reason under the *sharia*.

The prohibition on killing frogs in the hadith is a legal provision regarding the humane treatment of animals. The hadith does not directly discuss the concept of environmental conservation as stated in modern ecological science. However, the value of respect for the life of creatures created by Allah SWT. contained in the hadith can serve as an ethical foundation aligned with efforts to preserve biodiversity. In this context, the existence of frogs is viewed not only from the legal aspect of consumption but also from their ecological roles as controls on insect populations and as bioindicators of environmental health. Thus, the protection of frogs is a form of human responsibility in maintaining the balance of the ecosystem without ignoring the legal context and the main purpose of the hadith[18].

In the community's social practice, there are still some people in several areas who consume frogs, including a large frog known as *Todan* (an endemic frog of South Sulawesi). Based on research, *Todan frogs* are consumed by some people as a side dish or snack during

[18] Nurulaina Saidin, Mohd Ashrof, and Zaki Yaakob, "Permissible and Prohibited Animals in Islam: Insights from the Qur'an and Hadis" 1, no. 1 (2025): 189–204, https://doi.org/https://doi.org/10.24191/jhsmr.v1i1.8993.

gatherings and while drinking *ballo* (a traditional fermented drink). The tradition developed as a hereditary custom and part of the local culinary culture. However, the practice needs to be corrected through a religious approach and environmental education, because from an Islamic perspective, frogs are among the animals forbidden to be killed and consumed, according to the hadith of the Prophet *saw*. In addition, the consumption of frogs accompanied by intoxicating drinks such as *ballo'* is also contrary to Islamic law because *khamr* is prohibited in Islamic teachings. This phenomenon shows that cultural traditions still need to be studied and aligned with *sharia* values to avoid contradicting the principles of monotheism and Islamic ethics[19].

In addition to Islamic law, the prohibition on consuming frogs can also be understood from scientific and health perspectives. Frogs, as a group of amphibians, live in humid environments and waters that are susceptible to exposure to bacteria, parasites, and environmental pollutants. Several biological and health studies show that frogs, as a group of amphibians, can carry various pathogenic microorganisms and parasites that, if consumed, can harm human health. Amphibians live in humid environments and waters prone to pollution, so they are easily exposed to bacteria, fungi, and parasites. Research shows that frogs can host the parasite *Spirometra* sp., which can cause sparganosis in humans if frog meat is consumed. In addition, amphibians are known to carry bacteria such as *Salmonella*, larvae of *Spirometra* sp., and various parasites that can endanger human health. Frogs also serve as environmental bioindicators, so their bodies can accumulate harmful substances from polluted environments[20]. This condition shows that the prohibition of consuming frogs in Islam not only has a dimension of *sharia*, but also contains the wisdom of protecting human health and preventing harm.

The prohibition of frog consumption in Islam not only reflects spiritual values and *sharia* obedience but also serves the wisdom of maintaining human health and the ecosystem. sustainability. In some areas, stalls or restaurants have even begun to appear that sell processed frog meat, such as frog soup and other amphibious menus. Even though some of the consumers come from non-Muslim circles, the Muslim community still needs to be given an understanding so that they are not involved as sellers or consumers, because it is contrary to the provisions of Islamic law. From an ecological perspective, the overexploitation of frogs can also disrupt the balance of the food chain and lead to a decline in amphibian populations that play important roles in controlling insect populations and maintaining environmental quality[21].

[19] Saidin, Ashrof, and Yaakob.

[20] M Dandi Iqbal Iskandar et al., "Catatan Baru Larva Spirometra Sp . (Cestoda : Diphyllobothriidea) Pada Katak Sawah , Fejervarya Cancrivora , Di Leuwiliang , Kabupaten Bogor Jawa Barat A New Record of Spirometra Sp . (Cestoda : Diphyllobothriidea) Larvae from the Paddy Frog , Fejerva," *Journal Math and Science* 9, no. 2 (2024): 60–63.

[21] Saidin, Ashrof, and Yaakob, "Permissible and Prohibited Animals in Islam: Insights from the Qur'an and Hadis."

3. Frog in Q.S. al-A'raf: 133 as a punishment for the disobedient

Based on the Quran, there is a verse that specifically discusses frogs directly, which is found in Q.S. al-A'raf /7: 133[22].

فَاَرْسَلْنَا عَلَيْهِمُ الطُّوْفَانَ وَالْجَرَادَ وَالْقُمَّلَ وَالضَّفَادِعَ وَالدَّمَ اٰيٰتٍ مُّفَصَّلٰتٍ فَاسْتَكْبَرُوْا وَكَانُوْا قَوْمًا مُّجْرِمِيْنَ

Translation:

"So We sent upon them the flood and locusts and lice and frogs and blood as distinct signs, but they were arrogant and were a criminal people"

Based on the *Tafsir Wajiz* mentioned that the iniquity of Pharaoh and his people who had exceeded the limit was a form of punishment for them We sent them punishment in the form of a typhoon that caused a great flood that drowned their crops, locusts that ate their crops, agricultural products, houses, roofs, and clothes, fleas in the form of pest and germ attacks that damaged fruits, crops, and livestock, frogs that fill their drinking vessels, food, and beds, and blood by making the water of their rivers and wells unfit for use, as clear proofs for their faith. But their disposition is indeed hard, and their hearts are petrified, so they remain arrogant, and they are disobedient people who are always times more sinful[23].

Allah SWT sent down a very large number of frogs to the Egyptian people as a sign of His power. The frogs inhabit a variety of places, from open fields to people's homes. The animals jumped in various directions, contaminating the food and the surrounding environment, causing unrest and suffering for Egyptian society. In a state of distress, they then went to Prophet Moses (*as*) and promised to free the Children of Israel when the punishment was stopped. Prophet Moses (*as*) also asked Allah SWT, and Allah lifted the disaster from the land of Egypt. However, after things returned to normal, the Egyptian rulers broke their promise and continued to oppress the Children of Israel. Because of this iniquity, Allah SWT again showed signs of His power to strengthen the truth of the treatise of the Prophet Moses (*as*). One of the next miracles was the turning of the Nile into blood, thus further demonstrating God's greatness and serving as a warning to the disobedient[24].

According to M. Quraish Shihab in his tafsir *al-Misbah*, the horde of frogs sent to the Egyptian people was considered a form of punishment from Allah against those who disobeyed His commands and exceeded the limit. Previously, Allah had sent down various disasters such as typhoons, floods that swept away everything in their path, and storms accompanied by lightning, fire, and rain that destroyed everything. God also sent locusts that destroyed crops and destroyed their food supply, as well as fleas that caused disease to humans. God even turns drinking water into blood. All of this is clear and detailed evidence of God's power and the Prophet Moses's righteousness. However, despite being confronted

[22] Sunan Abu Dawud Abu Dawud Sulaiman Ibn al Ash‟ab Ibn Ishaq Ibn Bashir Ibn Sadad Ibn Umar, "Beirut: Dar Al Kutub Al Ilmiyyah,1996," in *Edidi IV*, 3871.

[23] Abdul Hasan Ali ibnu Muhammad Alwahidi, *Al-Wajiz Fii Tafsir Kitabul Aziz* (Damask: Darul Al-Qalam, 1994).

[24] Alwahidi.

with such concrete evidence, the Egyptian people still refused to acknowledge the power of God[25].

Based on the context of the interpretation of the Quran, the mention of frogs in this verse has a narrative and theological function, namely as part of a series of verses (*āyāt*) or signs of Allah's power addressed to those who deny His Messenger. The main focus of this verse is not to explain the biological characteristics or ecological functions of frogs, but to affirm the power of Allah SWT and the consequences of human disobedience and arrogance. The presence of frogs in the verse shows that these animals are part of a natural phenomenon that can serve as a means of conveying divine messages to humans. The understanding of frogs' roles as insect population controllers, food chain components, and bioindicators of environmental quality was derived from contemporary scientific studies. Thus, the ecological function of frogs, from a scientific perspective, should be understood as a study distinct from the verse's main meaning, yet the two can complement each other to provide a more comprehensive understanding of frogs' existence as part of the creation of Allah SWT[26].

4. The Prayer of Living Beings and the Meaning of the Frog's Voice in the Community (Q.S. al-Isra'/17:44)

تُسَبِّحُ لَهُ ٱلسَّمَٰوَٰتُ ٱلسَّبۡعُ وَٱلۡأَرۡضُ وَمَن فِيهِنَّۚ وَإِن مِّن شَيۡءٍ إِلَّا يُسَبِّحُ بِحَمۡدِهِۦ وَلَٰكِن لَّا تَفۡقَهُونَ تَسۡبِيحَهُمۡۚ إِنَّهُۥ كَانَ حَلِيمًا غَفُورٗا

Translation:
"The seven heavens and the earth and whatever is in them exalt Him. And there is not a thing except that it exalts (Allah) by His praise, but you do not understand their (way of) exalting. Indeed, He is ever Forbearing and Forgiving".

According to M. Quraish Shihab, this verse explains that all creatures created by Allah SWT, both living beings and objects considered dead by humans, always bless and submit to Him. The prayer beads are not always understood as verbal utterances like humans, but can be in the form of the state, order, and function of the universe that show the greatness and perfection of Allah SWT. Quraish Shihab also emphasises that humans have limitations in understanding the way other beings perform *tasbih*. The phrase "but you do not understand their rosary" shows that humans are incapable of grasping the language or form of servitude of other creatures to Allah. However, human ignorance does not mean that the prayer beads

[25] Muhammad Quraish Shihab, "Tafsir Al Mishbah Pesan, Kesan Dan Keserasian Al-Qur'an Vol 5 Surah Al-A'raf, Al-Anfal Dan Surah At-Taubah," *Tafsir Al-Misbah Vol.5* 5 (2019): 1–784, https://shorturl.at/lny37.

[26] Wahida Rahim, "NILAI-NILAI EKOLOGIS DALAM AL-QUR ′ AN : Suatu Kajian Tafsir Tematik," *Jurnal Studi Al-Qran Dan Al Hadis* 13 (2025): 184–99.

do not exist. All creatures carry out the provisions of Allah according to the nature of their creation[27].

This verse is also often associated with ecological awareness in Islam. Nature is not just an object of human exploitation, but a part of God's creatures that have their own functions and forms of devotion. Humans are commanded to maintain the balance of nature and not destroy it. In the context of animals such as frogs, this verse shows that all living things have a form of servitude to Allah SWT in accordance with His nature and provisions. The sound of the frog, which is scientifically understood as a form of biological communication, cannot be directly equated with the essence of the rosary mentioned in the Quran. However, the regularity of biological behaviour can be understood as part of the signs of the greatness of Allah SWT (*Kauniyah verse*) which shows the order and harmony of His creation. Thus, this verse teaches that humans need to view nature and all living things not only from a biological aspect, but also as part of a creation system that reflects the wisdom and power of Allah SWT[28].

Scientifically, frog sounds are a form of biological communication used to attract mates, defend territory, or respond to environmental conditions, especially ahead of the rainy season[29]. However, from the community's perspective, the sound of frogs is not only a means of communication or a biological phenomenon, but is also interpreted symbolically and mystically as a sign and means of communication with supernatural forces, especially in the context of rituals asking for rain. This meaning does not appear suddenly but is formed through the collective experience of society, inherited from generation-to-generation. When frog sounds often appear with changes in the weather, people associate them with a sign of nature, sometimes developing into a belief with mystical nuances[30].

Meanwhile, based on the perspective of the Quran, this understanding needs to be straightened out. Islam affirms that all living things, including frogs, are the creation of Allah SWT, who always blesses Him. Thus, the sound of a frog cannot be interpreted as a supernatural sign or have a certain power beyond the will of Allah. This phenomenon must be understood as part of the signs of Allah's greatness that show the order of nature (*sunnatullah*), as well as a form of creature servitude to the Creator that cannot always be reached by human reason. The interpretation of frog sounds as a mystical sign needs to be clarified through an ecological approach that integrates Islamic teachings and science. So that the community can understand that the existence and sound of frogs are among the signs of

[27] Muhammad Quraish Shihab, "Tafsir Al Mishbah Pesan, Kesan Dan Keserasian Al-Qur'an (Surah Ibrahim, Al-Hijr, An-Nahl Dan Surah Al-Isra)," *Tafsir Al-Misbah Vol.7* VII (2002): 667, https://shorturl.at/lny37.

[28] Soraya Ghotbi, "Ethical Rights of Animals in Islam" 9, no. 18 (2020): 255–68, https://doi.org/10.22034/ri.2020.189042.1334.

[29] Gunung Poteng et al., "PERILAKU SINYAL AKUSTIK DAN VISUAL DARI KATAK JANTAN Staurois," no. January (2021), https://doi.org/10.14203/beritabiologi.v19i3.

[30] Hidayat, "Simbolisme Katak Dalam Upacara Meminta Hujan Babangkongan Di Desa Surawangi Kabupaten Majalengka."

Allah's greatness in maintaining the balance of the ecosystem, not as a supernatural phenomenon contrary to the value of monotheism[31].

Frogs based on a science perspective

From a scientific perspective, frogs play an important role in maintaining ecosystem balance. Frogs serve as natural predators of various insects and other invertebrates, helping control pest populations. In addition, frogs are a source of food for other animals, so their existence plays an important role in the food chain. The decline in the frog population can disrupt the balance of the ecosystem and increase the population of certain insects that can damage the environment and agriculture[32].

Apart from serving as bioindicators, behavioural changes and declines in frog populations can also be understood as a form of "ecological warning" against environmental damage. The frog's sensitivity to climate change, water pollution, and habitat degradation suggests that the survival of these creatures is highly related to the overall quality of the environment. Thus, the scientific study of frogs is not only important in the field of biology but also relevant to building people's ecological awareness of the importance of maintaining natural balance and environmental sustainability[33].

Daily behaviour of frogs

Daily behaviour is a series of routine actions and habits carried out by an organism, which significantly affect the patterns of interaction and relationships with its environment[34]. The daily behaviour of frogs includes various types of adaptive behaviour that can be categorised in the ethogram, including the following[35].

Innate Behaviour

In the Islamic perspective, the innate behaviour of living beings shows that Allah SWT. created each creature with certain characteristics, instincts, and functions to maintain its survival. This phenomenon is part of *sunnatullah*, which is the decree and law of Allah SWT that applies to all of His creation. The ability of living things to protect themselves, obtain food, and adapt to their environment demonstrates the existence of order and balance

[31] Hidayat.

[32] Asri Azhari et al., "Keanekaragaman Amfibi (Ordo Anura) Di Hutan Lindung Gambut Londerang Tanjung Jabung Timur," *Biospecies* 15, no. 1 (2022): 10–15, https://doi.org/10.22437/biospecies.v15i1.14833.

[33] Yudha et al., "Keanekaragaman Katak Dan Kodok (Amphibia: Anura) Di Suaka Margasatwa Paliyan, Gunungkidul, Yogyakarta Frog and Toad Diversity (Amphibia: Anura) in Paliyan Wildlife Sanctuary, Gunungkidul, Yogyakarta."

[34] Syarif Hidayat Amrullah et al., "Tinjauan Umum Perilaku Hewan Di Indonesia Dan Integrasi Keilmuannya," *Teknosains: Media Informasi Sains Dan Teknologi* 15, no. 1 (2021): 1, https://doi.org/10.24252/teknosains.v15i1.15379.

[35] Sitorus, Tohir, and Trifani, "Pengamatan Aktivitas Harian Dan Waktu Aktif Katak Pohon Bergaris (Polypedates Leucomystax)."

in nature that has been established by Allah SWT. This shows that every living thing has a natural role and mechanism that supports the sustainability of the ecosystem[36].

Scientifically, Innate Behaviour is a series of responses or behaviours that appear automatically or commonly referred to as instinctive behaviour without any prior learning or practice[37]. Every organism has an innate relationship between stimulus and response, that is, the relationship between stimuli and reactions that have been formed naturally in the nervous system since birth, even before the organism undergoes the learning process[38]. Innate behaviour can be formed due to the evolution and adaptation of an organism to environmental factors. Some of the behaviours inherent in frogs include a jump reflex in response to predatory threats, which can increase the chances of survival. Frogs tend to hide and use camouflage to avoid predation. This camouflage allows the frog to blend into the surrounding environment, increasing the likelihood of going undetected by predators. In addition, frogs have an innate tendency to seek out water, both for drinking and to lay their eggs. Water is an important environment for the development of frog eggs and larvae, so this behaviour is a fundamental adaptive strategy in its life cycle[39].

Instinctively, frogs use their long, sticky tongues to catch insects or other small prey with precision and high speed. This response is the result of evolution and is part of the innate repertoire of behaviours that help frogs defend themselves and meet the nutritional needs of their natural habitat[40]. Frogs also have a vocalisation, or mating call, used to attract mates during the breeding season. Although the basic pattern of vocalisation is innate, its expression can be influenced by various environmental factors, such as temperature, humidity, population density, and the presence of competitors. Thus, frog behaviour is not completely rigid but shows a degree of plasticity that allows individuals to respond adaptively to changes in environmental conditions[41].

Learned Behaviour

The ability of living beings to adapt to their environment shows that Allah SWT. created every creature with certain potential, fitrah, and mechanisms to be able to maintain its survival. God did not create creatures in vain but equipped them with the ability to respond to environmental conditions in accordance with their life needs. This phenomenon is part of *sunnatullah*, which reflects the order and balance of Allah SWT's creation in the

[36] Amanullah, "Animal Ethics: An Islamic Perspective."

[37] Andi Fathir et al., "Perilaku Bawaan (Innate Behavior)," *Jurnal Biologi UIN Alauddin Makassar*, 2023, 1–9.

[38] Amrullah, *Etologi: Ilmu Perilaku Hewan*.

[39] Sitorus, Tohir, and Trifani, "Pengamatan Aktivitas Harian Dan Waktu Aktif Katak Pohon Bergaris (Polypedates Leucomystax)."

[40] Alexis C. Noel et al., "Frogs Use a Viscoelastic Tongue and Non-Newtonian Saliva to Catch Prey," *Journal of the Royal Society Interface* 14, no. 127 (2022), https://doi.org/10.1098/rsif.2016.0764.

[41] Poteng et al., "PERILAKU SINYAL AKUSTIK DAN VISUAL DARI KATAK JANTAN Staurois."

universe. This adaptability also shows that each creature has its own function and role in maintaining the balance of the ecosystem[42].

Biologically, Learned Behaviour is a behaviour that develops through the accumulation of an organism's experience over time. Learning is the process of behaviour change that occurs through interactions and experiences of an organism. In contrast to innate behaviours that are more instinctive and do not require experience to emerge, taught behaviours show greater flexibility because they can be adjusted and modified based on the situations and conditions faced by the individual. Taught behaviours include various forms of interaction and adaptation that enable individuals to respond to environmental changes more effectively[43]. One of the behaviours taught to frogs is mating behaviour, such as calling to their mates during the mating season. In the context of frog reproduction, mating calls are generally considered innate behaviours because they are part of the natural instinct to attract mates. However, how to use these calls can be influenced by experience and learning from previous interactions. Suppose the male frog realises that a certain call is more successful in attracting the attention of the female, then the call or pattern of attracting the mate is more often used. This ability shows that frogs not only rely on instinct but also adapt their behavioural strategies to environmental dynamics[44].

Feeding behaviour, adapting and avoiding predators

The eating behaviour, adaptations, and defence mechanisms of frogs reflect the signs of the greatness of Allah SWT in creating natural balance (*mīzān*). Allah created every creature with certain abilities and characteristics to maintain its survival and carry out its functions in the ecosystem[45]. Humans as caliphs on earth have the responsibility to maintain the habitat and preservation of living things and prevent environmental damage (*fasād fi al-arḍ*) that can disturb the balance of nature[46]. The phenomenon of adaptation in frogs also shows that all living things are subject to *sunnatullah*, the provision of Allah SWT that regulates life and the balance of the ecosystem in harmony[47].

Frogs have a variety of adaptive behaviours that support their survival in their environment, such as feeding, adaptation, and predator-avoidance behaviours. The eating behaviour of frogs can vary depending on their habitat, both in water and on land. Feeding behaviour in frogs involves a combination of anatomical adaptation and effective hunting strategies. Frogs act as natural predators that prey on insects and other small animals. Frogs

[42] Fajar Hidayat, Aminullah Elhady, and Khoirul Faizin, "Animals as Parables in the Qur ' an in the Context of Human Behavior in the Modern Era" 3, no. 01 (2025): 170–77, https://doi.org/10.58812/esssh.v3i01.

[43] Hadrian Rukmana et al., "Perilaku Terajar (Learned Behavior)," 2023, 1–8.

[44] Maribel Méndez-Tepepa et al., "A Review of the Reproductive System in Anuran Amphibians," *Zoological Letters* 9, no. 1 (2023): 1–17, https://doi.org/10.1186/s40851-023-00201-0.

[45] Hidayat, Elhady, and Faizin, "Animals as Parables in the Qur ' an in the Context of Human Behavior in the Modern Era."

[46] Amrullah, *Etologi: Ilmu Perilaku Hewan*.

[47] Hidayat, Elhady, and Faizin, "Animals as Parables in the Qur ' an in the Context of Human Behavior in the Modern Era."

use long, sticky tongues to catch prey quickly and accurately, while protruding eyes help detect prey's movements effectively. Most frogs employ a predator's sit-and-wait strategy, which is to wait for prey to approach before making a quick and precise attack. This behaviour makes frogs play an important role in maintaining ecosystem balance by helping control insect and pest populations. The main food of frogs is insects and arthropods, but larger frogs can also eat larger prey such as worms and small fish[48].



Figure 1. Eating Behaviour Frogs use their tongues to catch insects[49]

Adaptive behaviour in frogs refers to their ability to generate different phenotypes in response to the environments in which they live, which is essential for their survival during sudden climate changes. For example, some species of frogs may change their skin colour to camouflage themselves in the new environment, or alter their feeding and reproductive habits to adapt to changes in resource availability. These adaptations help frogs survive in the short term as environmental conditions change. However, if environmental changes are drastic and prolonged, frogs may need to evolve genetically for their species to continue to survive. This evolution will involve genetic changes that enable frogs to adapt more effectively to new conditions over the long term. Frogs are cold-blooded or ectothermic animals, which means that the frog's body temperature depends on the temperature of the environment. When there is a change in temperature in their habitat, frogs will tend to look for a warm place to raise their body temperature or look for a cooler place to lower or neutralise their body temperature[50].

In frogs, self-defence behaviour against predatory threats involves jumping. In addition, frogs also tend to hide and use camouflage to avoid predation. This camouflage allows the frog to blend into the surrounding environment, making it more difficult for predators to detect. With the ability to jump quickly when threatened and to hide using camouflage, frogs can effectively reduce the risk of being preyed upon, increasing their chances of survival in a threatening environment[51].

[48] Noel et al., "Frogs Use a Viscoelastic Tongue and Non-Newtonian Saliva to Catch Prey."

[49] Noel et al.

[50] Cinnamon S. Mittan and Kelly R. Zamudio, "Rapid Adaptation to Cold in the Invasive Cane Toad Rhinella Marina," *Conservation Physiology* 7, no. 1 (2020): 1–12, https://doi.org/10.1093/conphys/coy075.

[51] Sitorus, Tohir, and Trifani, "Pengamatan Aktivitas Harian Dan Waktu Aktif Katak Pohon Bergaris (Polypedates Leucomystax)."

Social behaviour (communication, marriage, migration and navigation)

The ability of frogs to communicate, migrate, and navigate shows that every living thing has been given nature and guidance by Allah SWT to carry out its life functions in nature. This behaviour reflects the order of Allah SWT's creation and is part of the *sunnatullah* that regulates the balance of the ecosystem. The sound of frogs, often interpreted mystically by some people, is a form of biological communication influenced by environmental conditions, especially humidity and the rainy season. Islam distinguishes between natural phenomena that can be explained scientifically and superstition that contains elements of shirk. The sound of frogs should be understood as part of the signs of the greatness of Allah SWT and a natural mechanism in animal life, not as a sign of occult or supernatural power. This understanding underscores the importance of examining natural phenomena scientifically without abandoning the values of monotheism in Islam[52].

The social behaviour of frogs includes various forms of communication, reproduction, migration, and navigation that support their survival in the environment. Frogs often depend on environmental conditions specific to different aspects of their life cycle[53]. The communication behaviour of frogs in general shows excellent flexibility in adapting to the environment. Many frog species have developed dual communication strategies that include modification of vocal calls and the use of visual signals. A mating call that varies in pitch, duration, and frequency helps frogs communicate effectively despite environmental acoustic interference. The use of visual signals adds another dimension to communication, enabling effective interaction even in poor voice-call conditions. These adaptations demonstrate the frog's ability to navigate and communicate in a changing environment, increasing opportunities for reproduction and survival.

Mating behaviour in frogs involves a variety of complex communication signals. Male frogs use advertising calls as the main call to attract the attention of female frogs and show their readiness to mate. These calls are often modified in amplitude, pitch, and duration, which can indicate an individual's genetic qualities. In addition, male frogs also perform *foot-flagging*, a foot movement that aims to focus the female's attention on advanced signals. Mating activities, which include *advertisement calls*, *foot-flagging*, and *amplexus*, tend to last longer, allowing for in-depth interaction between the two individuals before mating occurs[54].

In addition to communication and reproductive behaviours, frogs migrate for various purposes, such as foraging for food, avoiding bad weather, or reproducing. Migration also aims to help maintain the genetic diversity and conservation of endangered species. Frogs often migrate from terrestrial habitats to aquatic habitats during the mating season. Frogs follow environmental signals, such as changes in temperature and precipitation, to determine

[52] Hidayat, "Simbolisme Katak Dalam Upacara Meminta Hujan Babangkongan Di Desa Surawangi Kabupaten Majalengka."

[53] Lia Schlippe Justicia, Chloe A. Fouilloux, and Bibiana Rojas, "Poison Frog Social Behaviour under Global Change: Potential Impacts and Future Challenges," *Acta Ethologica* 26, no. 3 (2023): 151–66, https://doi.org/10.1007/s10211-022-00400-6.

[54] Poteng et al., "PERILAKU SINYAL AKUSTIK DAN VISUAL DARI KATAK JANTAN Staurois."

the timing and location of migration. Frogs often migrate to the water during the rainy season because increased rainfall increases humidity and provides the water needed for larval reproduction and growth. In the process of migration, frogs take advantage of navigational skills. Navigation is the ability of animals to precisely find their way or direction when moving from one location to another, with the aim of making it easier to find food sources and breeding sites, avoid predators, and adapt to environmental changes to maintain survival. Animals use a variety of navigation mechanisms, including responses to the Earth's magnetic and electric fields and to sound waves, which aid in navigation and orientation. Navigational behaviour in frogs involves using this ability to find their way to aquatic habitats necessary for reproduction, using environmental features and sensory abilities to direct travel accurately[55].

The synthesis of the frog's ecological role, local mystical beliefs, and Islamic religious values reveals that attributing biological phenomena—such as frog vocalizations—to supernatural forces stems from a gap in both local scientific and theological literacy. From a biological perspective, these acoustic signals represent adaptive communication and physiological responses to environmental humidity. From an Islamic standpoint, they constitute an inherent part of *sunnatullah*, illustrating cosmic balance (*mīzān*) and a form of non-verbal praise (*tasbīḥ*) to The Creator (Q.S. Al-Isra': 44).

The primary scientific contribution of this study lies in establishing an integrative framework of Islamic ecotheology and modern science, which effectively demystifies local superstitions while reinforcing spiritual ecological awareness. Based on this synthesis, key scientific and practical recommendations for local communities and stakeholders include:

1. Enhancing Eco-theological Literacy: Integrating science-Quranic environmental educational modules into madrasah and Islamic boarding school (*pesantren*) curricula to correct superstitious perceptions surrounding wildlife.
2. Public Health and Ecosystem Protection: Educating local communities to cease the wild harvesting and consumption of frogs (such as local traditions involving *Todan* frogs) to mitigate zoonotic health risks (e.g., *Spirometra* sp. parasitic infections and pathogenic bacteria) while preserving amphibian populations as natural pest controllers.
3. Community-Based Conservation: Encouraging active collaboration between religious leaders and environmental scientists to advocate for amphibian conservation as a moral duty of human stewardship (*khilāfah*) in preserving the earth.

D. Conclusion

Based on this discussion, it can be concluded that frogs are living creatures that have an important role in maintaining the balance of the ecosystem. From the perspective of the Quran and science, frogs are understood as creations of Allah SWT that serve ecological functions, such as maintaining the food chain and serving as bioindicators of environmental quality. The integration of Islamic and scientific perspectives in this study shows that

[55] Nurhaida et al., "Perilaku Kawin, Komunikasi, Migrasi Dan Navigasi Pada Hewan," *Jurnal Ekologi* 1, no. 3 (2021): 1–13.

phenomena related to frogs, including frog sounds often mystically interpreted by society, can be explained scientifically as biological responses to environmental conditions, such as humidity and the rainy season. An integrative approach to the Quran and science can provide a more comprehensive understanding of the existence of frogs as one of the signs of Allah SWT's greatness in the universe. In addition to clarifying the mystical meaning, the integration of Islam and science can also strengthen the ecological awareness of the Muslim community about the importance of maintaining the balance of nature and preserving living things as a mandate from Allah SWT.

This study contributes to Islamic studies, particularly by developing ecological interpretations that connect the teachings of the Quran with environmental issues and the conservation of living things. In addition, the results of this study underscore the importance of an integrative approach to Islam and science for a more complete understanding of natural phenomena. The next research is expected to examine the Muslim community's perceptions of frogs and amphibian conservation, as well as develop learning materials based on the Quran and scientific knowledge of animals and the environment for madrassas and Islamic boarding schools.

References

Abu Dawud Sulaiman Ibn al Ash‟ab Ibn Ishaq Ibn Bashir Ibn Sadad Ibn Umar, Sunan Abu Dawud. “Beirut: Dar Al Kutub Al Ilmiyyah,1996.” In *Edidi IV*, 3871.

Alwahidi, Abdul Hasan Ali ibn Muhammad. *Al-Wajiz Fii Tafsir Kitabul Aziz*. Damask: Darul Al-Qalam, 1994.

Amanullah, Muhammad. “Animal Ethics: An Islamic Perspective,” no. 2 (2022): 57–66.

Amrullah, Syarif Hidayat. *Etologi: Ilmu Perilaku Hewan*. Edited by Dirhamzah. I. Makassar: Tohar Media, 2024.

Amrullah, Syarif Hidayat, Dirhamzah Dirhamzah, Aswar Rustam, and Hasyimuddin Hasyimuddin. “Tinjauan Umum Perilaku Hewan Di Indonesia Dan Integrasi Keilmuannya.” *Teknosains: Media Informasi Sains Dan Teknologi* 15, no. 1 (2021): 1. https://doi.org/10.24252/teknosains.v15i1.15379.

Azhari, Asri, Tedjo Sukmono, Anggit Prima Nugraha, Mahya Ihsan, and Dawam Suprayogi. “Keanekaragaman Amfibi (Ordo Anura) Di Hutan Lindung Gambut Londerang Tanjung Jabung Timur.” *Biospecies* 15, no. 1 (2022): 10–15. https://doi.org/10.22437/biospecies.v15i1.14833.

Boll, V. M. (2006). Following Garkman , the frog , in North Eastern Arnhem Land (Australia). *Australian Zoologist*, *33*(4), 436–445. https://doi.org/https://doi.org/10.7882/AZ.2006.016

Fathir, Andi, Hidayat Said, Aulia Rakhmadhani, and Syarif Hidayat Amrullah. “Perilaku Bawaan (Innate Behavior).” *Jurnal Biologi UIN Alauddin Makassar*, 2023, 1–9.

Ghotbi, Soraya. “Ethical Rights of Animals in Islam” 9, no. 18 (2020): 255–68. https://doi.org/10.22034/ri.2020.189042.1334.

Hashimi, Sayed Abubaker. “Animal Rights in Islamic Law.” *Journal of Sciences-Kabul University* 2, no. 5 (2021): 155–69.

https://doi.org/https://doi.org/10.62810/jss.v7i4.178.

Hidayat, Fajar, Aminullah Elhady, and Khoirul Faizin. "Animals as Parables in the Qur ' an in the Context of Human Behavior in the Modern Era" 3, no. 01 (2025): 170–77. https://doi.org/10.58812/esssh.v3i01.

Hidayat, Lina Marliana. "Simbolisme Katak Dalam Upacara Meminta Hujan Babangkongan Di Desa Surawangi Kabupaten Majalengka," 2021, 414–25.

Iskandar, M Dandi Iqbal, Yuni Apriyanti, Widowati Budjiastuti, and Kartika Dewi. "Catatan Baru Larva Spirometra Sp . (Cestoda : Diphyllobothriidea) Pada Katak Sawah , Fejervarya Cancrivora , Di Leuwiliang , Kabupaten Bogor Jawa Barat A New Record of Spirometra Sp . (Cestoda : Diphyllobothriidea) Larvae from the Paddy Frog , Fejerva." *Journal Math and Science* 9, no. 2 (2024): 60–63.

Latif, Patra I. "Tafsir Tarbawi : Informasi Al-Quran Tentang Binatang." *Jurusan Pendidikan Guru Madrasah Ibtidaiyah* 2, no. 4 (2022).

Méndez-Tepepa, Maribel, Cuauhtémoc Morales-Cruz, Edelmira García-Nieto, and Arely Anaya-Hernández. "A Review of the Reproductive System in Anuran Amphibians." *Zoological Letters* 9, no. 1 (2023): 1–17. https://doi.org/10.1186/s40851-023-00201-0.

Mittan, Cinnamon S., and Kelly R. Zamudio. "Rapid Adaptation to Cold in the Invasive Cane Toad Rhinella Marina." *Conservation Physiology* 7, no. 1 (2020): 1–12. https://doi.org/10.1093/conphys/coy075.

Mohneke, M., Onadeko, A. B., & Rödel, M. (2011). Medicinal and dietary uses of amphibians in Burkina Faso. *African Journal of Herpetology*, *61*(1), 78–83. https://doi.org/10.1080/21564574.2011.564660

Nilawati, Tina Safaria, Hernawati, and Reza Ahmad Taufik. "Habitat and Population Characteristics of the Endemic Java Tree Frog (Rhacophorus Margaritifer) in Ranca Upas, West Java, Indonesia." *Biodiversitas* 20, no. 6 (2021): 1644–49. https://doi.org/10.13057/biodiv/d200621.

Noel, Alexis C., Hao Yuan Guo, Mark Mandica, and David L. Hu. "Frogs Use a Viscoelastic Tongue and Non-Newtonian Saliva to Catch Prey." *Journal of the Royal Society Interface* 14, no. 127 (2022). https://doi.org/10.1098/rsif.2016.0764.

Nurhaida, Wahdaniyah, Reski, and Nur Muhammad. "Perilaku Kawin, Komunikasi, Migrasi Dan Navigasi Pada Hewan." *Jurnal Ekologi* 1, no. 3 (2021): 1–13.Boll, Valérie M. "Following Garkman , the Frog , in North Eastern Arnhem Land (Australia)." *Australian Zoologist 33*, no. 4 (2006): 436–45. https://doi.org/https://doi.org/10.7882/AZ.2006.016.

Mohneke, Meike, Abiodun B Onadeko, and Mark-oliver Rödel. "Medicinal and Dietary Uses of Amphibians in Burkina Faso." *African Journal of Herpetology* 61, no. 1 (2011): 78–83. https://doi.org/10.1080/21564574.2011.564660.

Pallua, Jelka Vince. "What Can the Mythical Frog Tell Us? The Symbolism and Role of the Frog in History and Modernity." *Folklore: Electronic Journal of Folklore* 77 (2019): 63–90. https://doi.org/https://doi.org/10.7592/FEJF2019.77.pallua.

Poteng, Gunung, Kalimantan Barat, Mohamad Jakaria, Jurusan Biologi, Fakultas

Matematika, Pengetahuan Alam, Universitas Tanjungpura, Jl Prof H, Hadari Nawawi, and Kalimantan Barat. "Perilaku Sinyal Akustik Dan Visual Dari Katak Jantan Staurois," no. January (2021). https://doi.org/10.14203/beritabiologi.v19i3.

Rahim, Wahida. "Nilai-Nilai Ekologis Dalam Al-Qur ´ An : Suatu Kajian Tafsir Tematik." *Jurnal Studi Al-Qran Dan Al Hadis* 13 (2025): 184–99.

Rukmana, Hadrian, Muhammad Fadil, Fitrah Abd Gafur, Nur Isnaeni, and Nurul Azizah. "Perilaku Terajar (Learned Behavior)," 2023, 1–8.

Saidin, Nurulaina, Mohd Ashrof, and Zaki Yaakob. "Permissible and Prohibited Animals in Islam: Insights from the Quran and Hadis" 1, no. 1 (2025): 189–204. https://doi.org/https://doi.org/10.24191/jhsmr.v1i1.8993.

Schlippe Justicia, Lia, Chloe A. Fouilloux, and Bibiana Rojas. "Poison Frog Social Behaviour under Global Change: Potential Impacts and Future Challenges." *Acta Ethologica* 26, no. 3 (2023): 151–66. https://doi.org/10.1007/s10211-022-00400-6.

Shihab, Muhammad Quraish. "Tafsir Al Mishbah Pesan, Kesan Dan Keserasian Al-Quran (Surah Ibrahim, Al-Hijr, An-Nahl Dan Surah Al-Isra)." *Tafsir Al-Misbah Vol.7* VII (2002): 667. https://shorturl.at/lny37.

———. "Tafsir Al Mishbah Pesan, Kesan Dan Keserasian Al-Quran Vol 5 Surah Al-A'raf, Al-Anfal Dan Surah At-Taubah." *Tafsir Al-Misbah Vol.5* 5 (2019): 1–784. https://shorturl.at/lny37.

Sitorus, Desy Natalia, Rizki Kurnia Tohir, and Dita Trifani. "Pengamatan Aktivitas Harian Dan Waktu Aktif Katak Pohon Bergaris (Polypedates Leucomystax)." *Fakultas Kehutanan* 1, no. 1 (2024): 1–12.

Yudha, Donan Satria, Rury Eprilurahman, Hastin Ambar Asti, Herofi Azhar, Nurrochmah Wisudhaningrum, Puji Lestari, Siti Markhamah, and Imam Sujadi. "Keanekaragaman Katak Dan Kodok (Amphibia: Anura) Di Suaka Margasatwa Paliyan, Gunungkidul, Yogyakarta Frog and Toad Diversity (Amphibia: Anura) in Paliyan Wildlife Sanctuary, Gunungkidul, Yogyakarta." *Jurnal Biologi Udayana* 23(2), no. 2 (2021): 59–67.