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AN ANALYTICAL STUDY ABOUT THE INSECTS AND VECTORS MENTIONED IN THE HOLY QUR'AN IN THE LIGHT OF VETERINARY SCIENCES

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Abstrak: The Holy Qur'an mentions animals in several places. Some, like the pig, are mentioned to clarify what's forbidden. Others, such as donkeys, dogs, and crows, are used to illustrate bad human behaviour. The Qur'an also uses animals like camels, mosquitoes, flies, and spiders to encourage us to reflect on the signs of creation. Notably, horses receive an honourable mention. Several chapters in the Qur'an are even named after animals, including The Cow, The Ant, The Spider, The Bee, The Elephant, and The Cattle. The animals mentioned in the Holy Qur'an are quite diverse, encompassing domesticated animals, wild animals, insects and vectors, sea animals, snakes and reptiles, amphibians, and birds. These animals are mentioned in the Holy Qur'an in 155 verses across 52 chapters, sometimes by their specific names and other times through more general animal-related terms. Commentators of the Holy Qur'an sometimes misinterpret animal-related terms in the Qur'an due to unfamiliarity with the specific terminology. For instance, an English commentator translated al-Baqarah as the "heifer", though its accurate meaning is "cow". In veterinary science, a heifer is a young female calf, referred to as **بكر (سورة البقرة 2:68)**. Similarly, the insect **القمل (سورة الأعراف 7 :133)** is translated as the lice, but this research suggests it more accurately refers to the weevil. These examples highlight the potential for misinterpretation when commentators lack a strong understanding of animal-related terms. While many have written about animals in the Holy Qur'an, none have conducted an analytical study in the light of Veterinary Sciences. Their works generally discuss animals without this specific scientific perspective. These observations inspired me to undertake this study. The findings will provide Qur'an commentators and the public with a deeper understanding of animal-related terminologies. My decision to pursue this subject stemmed from the absence of any prior research of this nature. The method used for the study involved multiple steps. First, I read the Holy Qur'an twice specifically to identify all verses and chapters containing animal-related terminology. These terms were then categorized by species, including domesticated animals, wild animals, sea animals, snakes and reptiles, amphibians, insects, vectors, and birds. Finally, this categorized information was analysed in the light of Veterinary Science, al-Hadith and Tafsir (commentaries).

Kata kunci: Animal, al-Quran, Honeybees, Spider, Insect

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INTRODUCTION

Animals are mentioned in the Holy Qur'an in several places, either as a clarification of their prohibition (such as the pig) or to describe reprehensible actions of some humans (such as donkey, dog, and crow), or to reflect on the signs of creation (such as camels, mosquitoes, flies, and spiders), or to honour animals (such as horses). There are chapters named after some animals that are mentioned within it, namely: the cow, the ant, the spider, the bee, the elephant, and the cattle (grazing livestock).

The animals mentioned in the Holy Qur'an include domesticated animals, wild animals, insects and vectors, sea animals, snakes and reptiles, amphibians, and birds. Animals are mentioned directly by their names and miscellaneous terminologies related to animals in 155 verses and in 52 chapters of the Holy Quran. My thesis comprising of nearly 100,000 words dealt with all the animals mentioned in the 155 verses of the Holy Qur'an. The following are the eight Insects and vectors mentioned in the Holy Qur'an: البعوضة, الجراد, القمل, النحل, الذباب, العنكبوت, الفراش and النمل. Due to limitation of the number of words (5,000) per article only two Insects and Vectors namely النحل Honeybee and العنكبوت Spider have been dealt in this article.

al-Nahl (Honeybee)

Name of the Insect/Vector (Terminology)	Number of verses	Number of times appeared	No. of the Chapter and the Verse in which appeared
النحل Honeybee	1	1	16:68

As seen from the above table the term **النحل** has appeared One (1) time in Surah al-Nahl:


Honeybee


Honeybee beehive on a ceiling of a building,


on a tree

وَأَوْحَىٰ رَبُّكَ إِلَى النَّحْلِ أَنِ اتَّخِذِي مِنَ الْجِبَالِ بُيُوتًا وَمِنَ الشَّجَرِ وَمِمَّا يَعْرِشُونَ - سورة النحل 16:68

Meaning of the verse: And your Lord inspired the bees: "Make ˹your˺ homes in the mountains, the trees, and in what people construct:

ثُمَّ كُلِي مِن كُلِّ ٱلثَّمَرَٰتِ فَٱسْلُكِى سُبُلَ رَبِّكِ ذُلُلًا ۚ يَخْرُجُ مِنۢ بُطُونِهَا شَرَابٌ مُّخْتَلِفٌ أَلْوَٰنُهُۥ فِيهِ شِفَآءٌ لِّلنَّاسِ ۗ إِنَّ فِى ذَٰلِكَ لَـَٔايَةً لِّقَوْمٍ يَتَفَكَّرُون – سورة النحل 69: 16

Meaning of the verse: and feed from ˹the flower of˺ any fruit ˹you please˺ and follow the ways your Lord has made easy for you." From their bellies comes

forth liquid of varying colours, in which there is healing for people. Surely in this is a sign for those who reflect.

Theme of the verse: In the Bee and its Honey there is Blessing and a Lesson. What is meant by inspiration here is guidance. The bee is guided by Allah SWT to make its home in the mountains, in trees and in structures erected by man. The bee's home is a solid structure; with its hexagonal shapes and interlocking forms there is no looseness in its combs. Then Allah decrees that the bee will have permission to eat from the flowers of any fruits and to follow the ways which Allah has made easy for it, wherever it wants to go in the vast spaces of the wilderness, valleys and high mountains. Then each bee comes back to its hive without swerving to the right or left, it comes straight back to its home where its offspring and honey are. It makes wax from its wings, and regurgitates honey from its mouth, and lays eggs from its rear, and then the next morning it goes out to the fields again. (There is indeed a sign in that for people who reflect.) meaning in the fact that Allah inspires this weak little creature to travel through the vast fields and feed from every kind of fruit, then gather it for wax and honey, which are some of the best things, in this is a sign for people who think about the might and power of the bee's Creator Who causes all of this to happen. From this they learn that He is the Initiator, the All-Powerful, the All-Wise, the All-Knowing, the Most Generous, the Most Merciful.

There comes forth from their bellies a drink, namely, honey. There is a cure in honey for diseases that people suffer from. Some of those who spoke about the study of Prophetic medicine said that if Allah had said, `in which there is the cure for men', then it would be the remedy for all diseases, but He said, `in which there is a cure for men', meaning that it is the right treatment for every "cold" disease, because it is "hot", and a disease should be treated with its opposite. The Prophet (s) used to prescribe it for anyone suffering from stomach pains, as reported by the two Shaykhs [Bukhārī and Muslim]. Surely in that there is a sign for a people who reflect, upon God’s handiwork, exalted be He.

Honeybee: Honeybees (Apis mellifera) are eusocial insects that live in large colonies that are composed of sterile female worker bees (~35,000), hundreds of male bees (drones), and a single reproductive female, the queen bee. The small honeybee, long a symbol of hard work and cooperation, has one of the most complex social arrangements and caste systems in the entire animal kingdom. Honeybees are important plant pollinators. Beekeepers manage millions of bee colonies for honey production and pollination of numerous fruit, nut, vegetable, and oilseed crops.

Honeybee Facts

Honeybee Scientific Classification		Honeybee Facts	
Kingdom	Animalia	Main Prey	Nectar, Pollen, Honey
Phylum	Arthropoda	Fun Fact	There are only 8 recognized species!
Class	Insecta	Habitat	Sheltered forests and meadows
Order	Hymenoptera	Diet	Herbivore

Family	Apidae	Average Litter Size (number of babies)	200
Genus	Apis	Favourite Food	Nectar
		Scientific name	Apis (a Latin word that simply means bee)
		Common Name	Honeybee
		Number Of Species	There are only 8 recognized species
		Location	Worldwide
		Physical characteristics	Colour: Brown, Yellow, black Skin type: Hair

Three incredible Honeybee facts:

1. A single colony can contain up to 80,000 bees at a time.
2. These bees secrete wax between plates on the underside of the abdomen. This wax creates the comb-like structure in which the larvae reside.
3. It is believed that these bees can communicate important information to each other (including the location of food) through a complicated dance.

The defining characteristic of this insect is the ability to construct large colonial nests from wax and then convert nectar into sweet honey. Both the wax and the honey they produce are exploited by humans for our own personal uses. But bees also play a very important role in the environment by transporting pollen between flowers. Compared to the 20,000 species of bees, this bee genus (Apis) contains at least eight different recognized species. The western honey bee is by far the most common, especially for the purposes of making domesticated honey.

Morphology of Honeybee: Honeybees are small, flying insects with long, segmented bodies divided into the head, the thorax (essentially, the mid-section), and the abdomen from which a long and sharp stinger emerges. The body is covered in alternating bands of yellow/reddish brown and dark bands, which serve as a warning against potential threats. It also has two translucent wings, six legs, and small hair over its body. A typical bee is only about half an inch long.

The bee colony has a complex social arrangement comprised of three different classes. The male drones only serve one basic purpose: reproduction. During the winter months, they are expelled from the colony to save resources, and most end up dying. The female bees make up the entirety of the workforce. They forage for food, build up the hive, and protect it from threats. However, they are incapable of sexual reproduction. The queen, of which only one usually exists at a time, has sole reproductive duties and guides the activity of the entire hive. If one queen dies, then the colony can create another one by feeding a female larva a special elixir.

The queen bee is always escorted by several worker bees, the escort bees, which have as a mission to feed the queen, clean her and to circulate throughout the apiary the chemical substances or pheromones she excretes. All the chemical substances that the queen bee excretes are called “queen substance” and this defines her identity and her uniqueness.

Although queen bees and worker bees are female honey bees, they have very different roles in the hive. Worker bees earned their name because they are responsible for almost every job inside the colony, except for one thing –reproduction. Bees are oviparous, but while all worker bees are females, they are not fertile and cannot lay eggs. Only the queen bee is responsible for mating with drones and laying eggs.

Life cycle of a bee: For a bee to complete its development it goes through three stages; egg, larva and pupa. All eggs come from the queen bee. They are large, long and narrow and they have a special place inside the cell. After three days, eggs are ready for the incubation of the larva. The developing larvae are fed by the worker bees with royal jelly, pollen and honey until the day the cells are sealed with beeswax. After the cells are sealed, the larvae spin a cocoon around themselves, and they enter the pupa stage. The development time into an insect is different for everyone. To develop into a queen bee, 16 days from the day the egg is laid are needed; to develop into a worker 21 days are required and to become a drone 24 days must pass.

Habitat: These bees are actually endemic to South and East Asia and parts of Africa. Only the western bee (because of human domestication) is found in almost every ecosystem around the world except for the most extreme climates. With a few exceptions, they construct nests in protected areas such as tree cavities or the underside of buildings. Honeybees live in sheltered forests and meadows.

Predators of Honeybees include birds, rodents, reptiles, and insects. The honeybee has a sharp barb laced with venom that produces a painful reaction. They will sting most often in direct defence of the colony rather than for their own protection. In an act of self-sacrifice, honeybees do, in fact, die after stinging. The sting of the honeybee may be painful, but it only poses a danger to the small number of people who are allergic to the venom, which can cause nausea and fainting.

Diet: Honeybees are Herbivores; they get all their nutrients from pollen and nectar, which are both products of plants. Pollen provides most of the protein, while nectar provides most of the carbohydrates and water. To survive the coldest months, the workers store up food reserves for the winter in their honeycombs. They create honey by processing the nectar inside of their bodies and then regurgitating it.

Natural Cell Structure of Honeybee Comb Cells

The hexagonal structure of the honeybee comb cell has been the source of many studies attempting to understand its structure and function. In the storage area of the comb, only honey is stored, and no brood is reared. *The honeybee cell is an engineering wonder and has been the source of much research over time.* Researchers have found that honeybees design their cells with precise engineering to increase storage capacity, and to create adequate growing room for their brood.

Honeybees build beeswax secreted by their wax glands into an array of closed-packed cylinders, which are rapidly transform into hexagonal structures (Pirk etal. 2004, Karihaloo etal. 2013, Oldroyd and Pratt 2015, Talukdar and Dutta 2019). According to Pirk etal. (2004) and Karihaloo et.al. (2013), thermoplasticity and surface tension of beeswax play a key role in this process.

The honeybee comb cells are differentiated into worker, drone and honey cells, differing in their diameter and depth. Honey cells are larger and have a larger storage capacity than worker and drone cells. Honey cells are in the upper regions of the combs (Seeley and Morse 1976). Honeybees use the structure of the honey cell economically and for storage capacity relative to the brood cells. Further, the unique structure of honeybee comb cells allows for bees to perform various functions and strengthens the storage capacity due to the depths of the cells and separating the brood cells from the honey cells. [In fact, honeybees are such a fascinating topic for mathematical study that a famous entomologist once quoted them as "*heaven-instructed mathematicians*."]. The root of this mathematical fascination lies in bees' instinct to produce hexagonally shaped honeycomb.

So, *why the hexagons?*

For one, hexagons are known to be one of the **strongest geometric shapes**. More important to bees, however, is the fact that these shapes fit together perfectly with the most area of open space. This results in the least amount of wax used for the highest volume of storage. Charles Darwin described bees' ability to build perfect honeycombs as "the most wonderful of all known instincts." Each hexagonal cell is so precisely constructed and so neatly arrayed that a comb is a visual treat.

Mathematicians claim that hexagon is the most efficient shape in nature. The six-sided shape of the hexagon makes it the most muscular structure among other geometrical shapes. Hexagonal shape utilizes space and resources important for the bee efficiently. More significantly, hexagon gives a compact structure and zero gaps between each unit in a beehive. This dense structure requires less wax to be built, which is what bees exactly want.

Sue Cobey, a bee researcher at Washington State University, says that "bees have to consume approximately 8 ounces of honey to produce 1 ounce of wax." Using other shapes (e.g., a triangle or square) would only lead to more wax produced for the same volume of storage. And to think, Honeybees "discovered" this long before researchers were able to identify the purpose behind the hexagonal shape in honeycomb. Subhan Allah, the bee is guided by Allah SWT to make its home in the mountains, in trees and in structures erected by man.
Honey is a sweet, viscous food substance made by honeybees. Bees produce honey from the sugary secretions of plants (floral nectar), by regurgitation, enzymatic activity, and water evaporation.

Honeybees store honey in wax structures called honeycombs. The variety of honey produced by honeybees (the genus *Apis*) is the best-known, due to its worldwide commercial production and human consumption. Honey is collected from wild bee colonies, or from hives of domesticated bees, a practice known as beekeeping or apiculture (meliponiculture in the case of stingless bees).

Honey gets its sweetness from the monosaccharides fructose and glucose, and has about the same relative sweetness as sucrose (table sugar). Fifteen millilitres (1 US tablespoon) of honey provides around 190 kilojoules (46 kilocalories) of food energy. It has attractive chemical properties for baking and a distinctive flavour when used as a sweetener. Most microorganisms do not grow in honey, so sealed honey does not spoil, even after thousands of years.

Honey is produced by bees collecting nectar and honeydew for use as sugars consumed to support metabolism of muscle activity during foraging or to be stored as a long-term food supply. During foraging, bees use part of the nectar collected to support metabolic activity of flight muscles, with the majority of collected nectar destined for regurgitation, digestion, and storage as honey. In cold weather or when other food sources are scarce, adult and larval bees use stored honey as food.

Leaving the hive, a foraging bee collects sugar-rich flower nectar, sucking it through its proboscis and placing it in its proventriculus (honey stomach or crop), which lies just dorsal to its food stomach. The honey stomach holds about 40 mg of nectar, or roughly 50% of the bee's unloaded weight, which can require over a thousand flowers and more than an hour to fill. A single worker can make about a single tablespoon of honey in its lifespan (During summer, worker bees only live for five to six weeks, and in winter– five months or more).

Chemical composition of Honey:

Percentage composition of honey			
Fructose	38.2	Higher carbohydrates	4.2
Glucose	31	Sucrose	1.5
Water	17.1	Minerals, Vitamins and Enzymes etc	0.5
Maltose	7.2		

Carbohydrates: These comprise the major portion of honey – about 82%. The carbohydrates present are fructose (38.2%) and glucose (31%) and Sucrose, Maltose etc about 9%. There are also some oligosaccharides (higher carbohydrates) present (4.2%).

Proteins and Amino Acids: Honey contains several enzymes which convert sucrose to glucose and fructose; amylase which breaks starch down into smaller units - glucose oxidase. Honey also contains eighteen free amino acids.

Vitamins, Minerals and Antioxidants: Honey contains trace amounts of the B vitamins; Riboflavin, Niacin, folic acid, Pantothenic acid and vitamin B6. It also contains ascorbic acid (vitamin C), and the minerals Calcium, Iron, Zinc, Potassium, Phosphorous, Magnicium, Selenium, Chromium and Manganese.

The main group of antioxidants in honey are the flavonoids of which one, Pinocembrin, is unique to honey. Ascorbic acid, catalase and Selenium are also antioxidants. The darker the

honey, the greater its antioxidizing properties. Other compounds: Honey also contains organic acids such as acetic, butanoic, formic, gluconic acids and several aromatic acids.

Preservation: Because of its composition and chemical properties, honey is suitable for long-term storage. The long shelf life of honey is attributed to an enzyme *glucose oxidase* found in the stomach of bees.

Therapeutic Properties of Honey:

Honey has been successfully used in medicine traditionally for ages to treat infectious diseases. Its beneficial effects in different disorders have been rediscovered in recent decades. These amazing properties of honey are because of the involvement of various bioactive compounds. Honey is becoming sustainable as a reputable and effective therapeutic agent to practitioners of conventional medicine and to the public. Its beneficial role has been endorsed due to its antimicrobial, antiviral, anti-inflammatory, and antioxidant activities as well as boosting of the immune system. Also, other medical conditions with honey include diarrhoea, gastric ulcer, dermatitis, diabetics, tumour, and arthritis, and honey can also be used for skin disinfection and wound healing. Most of the known factors that give honey these properties include its acidity, high sugar, hydrogen peroxide, and other non-peroxide properties. Some factors may affect the therapeutic properties of honey such as exposure to heat and light.

Honey has been successfully used in medicine since antiquity. However, with the advent of modern medicine it has been less used, especially in the English-speaking world. Its benefi cial effects in different disorders, rediscovered in recent decades, will be discussed below based on a series of international scientific studies conducted to investigate the therapeutic properties of this natural product and published on Medline. It should be noted, however, that the therapeutic use of honey in everyday clinical practice needs to be validated by relevant guidelines and should only be adopted under medical prescription, in accordance with criteria of efficacy and safety for both patients and healthcare providers.

International Scientific Evidence of The Use of Honey in Medicine

In ancient times, soldiers with very serious wounds and burns were treated with a mixture of honey and curdled milk applied on the injuries with a cotton bandage. A similar mixture was used in different cultures throughout history, including the Romans, many African tribes, native Americans, and rural populations in the South of the United States. Used as a local treatment, honey is very useful as a healing agent and, compared to pharmaceutical products, has the advantage of being inexpensive not a minor detail in our days, when medicine is expected to be not only effective and efficient, but also low-cost. In the treatment of dressed or infected wounds, honey is often more effective than pharmaceutical preparations, and more easily available.

Honey has a recognized antibacterial activity. Its use in surgery is strongly recommended, also for the topical treatment of postoperative wounds, such as Cesarean sections. In addition to antibacterial properties, scientific evidence supports anti-inflammatory and immuno- stimulating activity of honey.

A mixture of honey, olive oil and bee wax is an effective treatment for haemorrhoids and anal fistulas. Honey also helps treat cough and breathing difficulties in children with upper respiratory tract infections. Studies have confirmed its antibacterial activity against the growth of Escherichia coli and Pseudo-monas aeruginosa colonies. Honey is also recommended in dental hygiene. The use of honey chewing-gum three times a day after meals significantly reduces plaque and the risk of gingivitis. It also has therapeutic properties in the treatment of gingivitis and periodontal disorders. In dermatology, the use of mixtures containing honey, olive oil and bee wax is very helpful in the treatment of dermatitis and psoriasis vulgaris and dandruff (provided the treatment is applied every day for at least four weeks), by com-bining antibacterial activity with antifungal and antioxidant effects. Honey taken orally also has medicinal properties as demonstrated by other important studies. Propolis, a product of honey, seems to have positive effects on intestinal giardiasis, a parasitosis which affects mostly children. A comparison between the effects of glucose and honey in increasing the blood sugar levels of patients with diabetes mellitus has demonstrated that honey causes less hyperglycaemia than sugar. Therefore, in diabetic patients, honey is indicated as a good substitute for sugar, with the additional benefit of a lower glycaemic value.

العنكبوت Spider

Name of the Insect/Vector (Terminology)	Number of verses	Number of times appeared	No. of the Chapter and the Verse in which appeared
العنكبوت Spider	1	2	29:41, 29:41

As seen from the above table the term al-Ankabut has appeared Twice (2) in Surah al-Ankabut:

مَثَلُ ٱلَّذِينَ ٱتَّخَذُواْ مِن دُونِ ٱللَّهِ أَوْلِيَآءَ كَمَثَلِ ٱلْعَنكَبُوتِ ٱتَّخَذَتْ بَيْتًا ۖ وَإِنَّ أَوْهَنَ ٱلْبُيُوتِ لَبَيْتُ ٱلْعَنكَبُوتِ ۖ لَوْ كَانُواْ يَعْلَمُونَ – سورة العنكبوت41: 29

Meaning of the verse: The parable of those who take protectors other than Allah is that of a spider spinning a shelter. And the flimsiest of all shelters is certainly that of a spider, if only they knew.

Theme of the verse: The parable -Likening the gods of the Idolators to the House of a Spider. This is how Allah described the idolators in their reverence of gods besides Him, hoping that they would help them and provide for them, and turning to them in times of difficulties. In this regard, they were like the house of a spider, which is so weak and frail, because by clinging to these gods they were like a person who holds on to a spider's web, who does not gain any benefit from that. If they knew this, they would not take any protectors besides Allah. This is unlike the Muslim believer, whose heart is devoted to Allah, yet he still does righteous deeds and follows the Laws of Allah, for he has grasped the most trustworthy handle that will never break because it is so strong and firm. Then Allah warns those who worship others besides Him and associate others with Him that He knows what they do and the rivals they associate with Him. He will punish them for their attribution, for He is All-Wise and All-Knowing.

This is one of the several examples Allah ST gave for mankind: As Allah mentioned in the following verse:

وَتِلْكَ الأَمْثَالُ نَضْرِبُهَا لِلنَّاسِ وَمَا يَعْقِلُهَآ إِلاَّ الْعَـلِمُونَ

Meaning: And these are the examples We give for mankind; but none will understand them except those who have knowledge.)"

Spider is an eight-legged predatory insect with an unsegmented body consisting of a fused head and thorax and a rounded abdomen. Spider has eight eyes. Spiders have fangs that inject venom into their prey, and most kinds of spin webs in which to capture insects. Spiders range in body length from 0.5 to about 90 mm (0.02–3.5 inches).

When the spider wants to weave a web, it transports the liquid through a channel that flows into its abdomen, from which the silk fibre emerges. This process takes less than a second. However, it takes about thirty minutes to create a web. Silk is produced by specialized glands found in the abdomen of the spider that are formed of liquid protein generated within the body. Spider web is made of protein just like our hair and fingernails. This protein hardens once it is outside of the body and released through the rear of the abdomen and allows the spider to customize its release as needed abdomen and adhesive, stretchable, and translucent webs to capture their prey. Externally, the web is too flimsy to protect the spider against rain and strong wind and cold and heat. Internally, the spider's family structure is fragile, since some species are cannibalistic, with the female preying on the male and the young eating their own mother). A strand of a spider web (called spider silk) is very thin (thinner than one strand of hair) and easy to break. Many spiders replace their entire web every single day. Spiders may eat their web regularly to regain some of the energy they had lost while building it. In this way, the protein in spider silk is recycled.

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