AL KITAB
The Renaissance Project

Chapter 14

Animal Behaviour

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The Behavior of Insects and Spiders

One of the major objectives of this book is to present scientific information in an interesting and engaging manner. I always thought this would be difficult for this chapter as I never thought insects could be appealing to me or to the majority of readers. However, during my research, I was surprised to find out that insects and spiders are absolutely fascinating. Their social behavior, lives, and interactions are so unique yet so similar to human beings that one cannot help but marvel at these tiny creatures.

Most of the readers will remain skeptical of this claim, but if one were to put aside his/her disgust for these animals, they are just as likely to be fascinated by these incredible species that have seemingly conquered our planet.

1 Prominence

Insects and particularly ants have colonized the world like no other species has. For example, ants vastly outnumber all other animals, and though tiny, their combined weight outweighs the total weight of human beings, making up one tenth of the total weight of all animals on Earth.(1)

Did you know?

Ants are capable of living for many years. The longest living ant observed was 28 years old!(1)

Insects are also very important to life. For example, bees are not only responsible for producing honey and wax, they are responsible for about 80% of the food on the supermarket shelves through their pollination activities (2)

Having established their prominence and importance, let us take a closer look at their social behavior. Though insects differ in their anatomy and functions, they have some underlying behavioral similarities and differences. This chapter will investigate the behavioral themes listed below:

- Role of gender
- Role of community
- Communication systems
- Role of family

Before starting with the first of these themes, it is important to note that each of these animals may have thousands of species with each species differing from the other. For example, there were an estimated 12,467 species of ants in 2008 and estimates of anywhere between 30,000 and 90,000 species that are still undiscovered.(3) As such, the scientific facts presented here are generic and may not apply to all species of a particular animal.

Notes (1): Laurent Keller & Elisabeth Gordon, "The Lives of Ants"
(2): The International Bee Research Association Estimates
(3): Laurent Keller & Elisabeth Gordon, "The Lives of Ants"

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2 Female Dominance – Role of Gender

Whether its ants, bees or spiders, females, particularly in the former two, dominate the species. For example, all worker ants are female and are responsible for gathering food, waging war, protecting and building the colony and nursing the young. The same can be said of bees, especially eusocial bees[4] where females are responsible for building, maintaining, and protecting the hive. The male bees and ants have no role in the colony and their function is limited to the fertilization of the queen. Once the task has been completed, the male ant or bee expires or is killed by the female gender.

The standing of the female gender is further enhanced among bees and ants by the presence of the queen. The queen is the most important individual of the colony or hive as she is responsible for laying eggs and providing the manpower that is needed to keep the colony or hive thriving. The queen is usually pampered and provided with utmost care, and in the event of an attack or war, the worker bees and ants hurry to their queen to protect her and remove her from harm's way; they recognize that the success of the colony or hive depends on her survival. This is more so in ants than bees where the death of the queen will usually spell the death of the colony.[5]

The prominence of the female can also be said of the female spider which is responsible for building the spider's house (spider web), laying the eggs, and nurturing the young.

Queen Ant – The Science

Different colonies have different social arrangements. Some are ruled by one Queen ant, much like a colony. Others are ruled by many queens sharing power in a fashion similar to an oligarchy. Finally, some colonies live in anarchy where all ants are deemed equal. Leadership is contested through outright conflict and a queen is crowned based on her strength and ability to beat other rivals

Did you know?

Under most ant species, the Queen is responsible for laying eggs. Thus, ants in colonies ruled by a single queen are all sisters

3 Community

Most animals such as spiders live a solitary life, with interaction limited to mating practices. Human beings, lions, and dolphins are a few exceptions to this rule. The same can be said of insects were the majority of species live solitary lives. The few exceptions to this rule include ants and eusocial bees

Ants and Eusocial bees not only live in communities, but are utterly reliant on them. Their strength and ability to survive is wholly dependent on their ability to coordinate efforts and help one another. In fact, ants and eusocial bees have been described as the most selfless creatures, glad to give up their lives for the good of the colony / hive. This strong sense of a collective life and socialization has enabled ants and eusocial bees to acquire levels of intelligence that are astonishing. As Gould mentions in his book "Animal Architects", if chimps were to acquire some of the behaviors of honeybees, many would proclaim that chimps have acquired the ability to think and exercise cognitive function!

One of the best examples of this collective sense and loyalty to the community can be found in most ants whose actions and socialization is always compared to human beings. For example, ants employ a very strict division of labor. Each ant has defined role in contributing to the colony, one that it conforms to without hesitation. Among such roles are the nursemaids, who ensure the Queen's babies receive the care and nutrition required for their survival. There are building ants that are responsible for maintaining the colony and

Notes (4): Eusocial bees are the only bees that are able to produce honey in sufficient quantity
(5): Laurent Keller & Elisabeth Gordon "The Lives of Ants"

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building its expansion. Others are responsible for scouting the environment for food, and once found, they communicate this to foragers who leave the colony in mass to collect the food deposits. Similarly, some scouts scan the perimeter for immediate danger and quickly alert their fellow sisters of any imminent threat. Finally, many species of ants have standing armies that are willing to go to war to protect colony interests.

Did you Know?

Even the behavior of colonies is reminiscent of human beings. Some are peaceful, using diplomacy to solve conflict. Others are treacherous, invading colonies under disguise, killing the queen and enslaving the population. The most notorious of ants are the aggressive army ants, who are in a constant state of war and are able to rip apart a scorpion in a matter of minutes

4 Communication

Most of us tend to equate communication with spoken language. This is inaccurate as complex communication can be done in various ways. For example deaf people communicate through sign language. Similarly, the use of signals, torches, and banners by the military are all important means of coordinating and communicating with allies and team members.

Some of us also tend to think that only human beings are capable of communication. This again is not true. As Keller and Gordon explain in their book “the lives of ants”: “Human beings, who tend to see communication as inseparable from language, need to be reminded that communication is not just a human thing, but is widely practiced by many other animals. Indeed the very survival of many species depends on it”. Furthermore, they point to the fact that the more complex the organization of a society is for a particular animal, the more complex is its communication system. Naturally, due to the complexity of ant and bee societies, one would expect to find complex communication systems used to coordinate efforts between worker sisters.

Honey Bee Dance – The Science

Honey bee dances are so sophisticated they are deemed a language by many. They can be so accurate in pin pointing the exact location of an object or event that is a vast distance away. Honey bee dance language is not universal; every colony or sub species will have its own language. For example, for the Egyptian honeybees, a waggle means about ten years while to the Italian honeybees, it is closer to twenty. Furthermore, directions will vary between different colonies or groups. Thus, honey bees use “arbitrary conventions to describe events or objects distant in space and time”.(6)

For example, ants can communicate in a variety of ways, the most important of which is the use of chemicals. It is often described as a chemical language in which the release of pheromones represent the words. Keller and Gordon site anywhere between 10 and 20 different pheromones that can be released by ants depending on the species, each pheromone representing its own “meaning”. For example, “some are produced by workers for recruiting their sisters or for alerting them to danger. Others are used to mark territory, for identifying members of their colony or conversely for detecting foreigners”. Furthermore, they cite an alarm system, that when activated by ants who detect a danger, alerts all the nest-mates.

But chemicals are not the only way in which ants can communicate with one another. Similar to the honey bee, ants can communicate through dancing. More impressively, they can exchange messages through squeaking. They are described as high pitched sounds, inaudible to the human ear, that can be used to send distress signals or to recruit other workers.(7)

Notes (6): James Gould & Carol Gould, “Animal Architects: Building and the Evolution of Intelligence”
(7): Laurent Keller & Elisabeth Gordon “The Lives of Ants”

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5 Family

In eusocial insects such as honeybees and ants, family is vital to survival. We have already described the relationship between the queen and her daughter workers. We have also seen the strong bond shared between sisters in a colony or hive. Though some ant colonies may have multiple queens or no queens, family ties are often crucial for the functioning of these species. The same cannot be said of spiders. As solitary creatures, family bonds are usually weak and in some cases, horrible to imagine.

For example, in some species, when a female spider has lured its male counterpart to her nest for mating, she often decapitates or kills the male after she has been fertilized or during the mating process![8] The female spider fares no better with her children; in some species, the children may turn against their own mothers and kin, killing them in the process[9]. Solitude and survival are thus the driving values of this animal and the role of family is nonexistent.

Among the four themes of gender, community, communication, and family, let us now investigate the behavioral references of animals in the Quran

Notes (8): Wilder et al. "Sexual Size Dimorphism Predicts the Frequency of Sexual Cannibalism Within and Among Species of Spiders", Pruitt et al. "Precopulatory Sexual Cannibalism Causes Increase Egg Case Production, Hatching Success, and Female Attractiveness to Males"

(9): Salamon et al, "Maternal nutrition affects offspring performance via maternal care in a subsocial spider"

Insects and Spiders in The Quran

We have already discussed how the Quran makes thousands of natural and scientific like observations throughout its text. Among the elements of nature that are frequently mentioned are animals, and more specifically insects, which take a prominent role.

Most of these references are in the form of stories, proverbs and/or observations that provide evidence of God's design. However, if one were to look more closely, one can realize that these references describe behavioral characteristics of certain species which are remarkable accurate.

Unlike other chapters, this chapter does not highlight these references as evidence of advance scientific knowledge. Rather, the chapter's purpose is to show alignment of fact and scripture, starting with the role of gender in selected species.

وَأَوْحَىٰ رَبُّكَ إِلَى ٱلنَّحْلِ أَنِ ٱتَّخِذِى مِنَ ٱلْجِبَالِ بُيُوتًا وَمِنَ ٱلشَّجَرِ وَمِمَّا يَعْرِشُونَ (68) ثُمَّ كُلِى مِن كُلِّ ٱلثَّمَرَٰتِ فَٱسْلُكِى سُبُلَ رَبِّكِ ذُلُلًا ۚ يَخْرُجُ مِنۢ بُطُونِهَا شَرَابٌ مُّخْتَلِفٌ أَلْوَٰنُهُۥ ۚ فِيهِ شِفَآءٌ لِّلنَّاسِ ۗ إِنَّ فِى ذَٰلِكَ لَءَايَةً لِّقَوْمٍ يَتَفَكَّرُونَ (69)(16, 68 - 69)

Your Lord revealed to the honeybees: "Make homes in the mountains, in the trees and in the structures they raise. (68) Then, eat from all the fruits, and go along the pathways of your Lord made easy for you." From their bellies comes out a drink of various colors in which there is cure for people. Surely, in that there is a sign for a people who ponder

حَتَّىٰٓ إِذَآ أَتَوْا۟ عَلَىٰ وَادِ ٱلنَّمْلِ قَالَتْ نَمْلَةٌ يَٰٓأَيُّهَا ٱلنَّمْلُ ٱدْخُلُوا۟ مَسَٰكِنَكُمْ لَا يَحْطِمَنَّكُمْ سُلَيْمَٰنُ وَجُنُودُهُۥ ۙ وَهُمْ لَا يَشْعُرُونَ (17) (27, 17)

"Until when they reached the valley of the ants, one of the ants said, "O ants, enter your dwelling places, lest Sulaiman and his armies crush you unknowingly." (17)

مَثَلُ ٱلَّذِينَ ٱتَّخَذُوا۟ مِن دُونِ ٱللَّهِ أَوْلِيَآءَ كَمَثَلِ ٱلْعَنكَبُوتِ ٱتَّخَذَتْ بَيْتًا ۖ وَإِنَّ أَوْهَنَ ٱلْبُيُوتِ لَبَيْتُ ٱلْعَنكَبُوتِ ۖ لَوْ كَانُوا۟ يَعْلَمُونَ (41)(29, 41)

"The example of those who have adopted patrons other than Allah is like the spider who taketh onto herself a home, Truly the most brittle of homes is the home of the spider if only they knew (41)

1 Gender

The verses describing spiders, bees, and ants highlight the prominent role of the female gender. The ant worker warning its colony, the eusocial / honey bee seeking nectar, and the spider residing in its home are all described as females in the Arabic text (though this is lost in translation for ants and bees). This is in line with the gender roles seen in these animals. Worker bees and ants are all female. Similarly, female spiders are responsible for building the spider web.

2 Community

On social organization, we have seen how eusocial bees and ants are social species while spiders prefer to live in solitude. The verses above make that distinction where bees and ants are described in groups showing strong communal loyalties in contrast to the spider, which is seen as a solitary creature(10).

Notes (10): There are a few spider species that are the exception to this rule and are dubbed as "social spiders". However, the majority of spiders are solitary in nature

Insects and Spiders in The Quran

3 Communication

More impressive perhaps is the story of the ant and Suleiman (Solomon). In the story, the ant acts as a scout / body guard that observes the outer perimeters of the colony and detects the danger of the incoming army of Suleiman. Once detected, the ant communicates this danger to its fellow workers. This, as we have seen, is in line with scientific observations: scouts / guards of ants patrol the perimeter and have the ability to communicate and warn their fellow sisters of impeding danger through the release of chemicals and / or by squeaking (inaudible voice to the human ear).

4 Family

Finally, the role of family and spiders is referenced in the Quran. Here, the verse uses a proverb to make parallel between the unbeliever and the spider taking shelter in its home. One does not need to investigate the science to understand how the physical structure of the spider's home (web) is easily destroyed. What is interesting about this verse is its last words "if they only knew". It is as if the fragility of the spider's home is somehow oblivious to the reader. This point is stressed in the verse that follows it:

وَتِلْكَ ٱلْأَمْثَـٰلُ نَضْرِبُهَا لِلنَّاسِ ۖ وَمَا يَعْقِلُهَآ إِلَّا ٱلْعَـٰلِمُونَ (43) (29, 43)

"And these similitudes! We propound them for mankind; and none understand them save men of knowledge" (43)

We must ask again, why would this proverb be understood only by men of knowledge? Clearly, any individual is able to see the brittleness of a spider's home.

It is only when you learn about the spider's family life and the precarious and brutal interactions between the home's family members do you understand the full meaning of the verse. For example, studies have shown that some female spiders decapitate or kill the male partner during mating. The loss of the father does not seem to inhibit further violence when the children, once born, kill one another and / or turn on their mothers. The spider's home, both physically, and from a family perspective, is one of the most precarious in the animal kingdom: a fact that the Quran makes clear hints of.

To close this chapter, some readers may wonder why insects have been given so much attention in stories and parables of the Quran. There are chapters named after ants, bees and spiders. Surely, these small creatures should not warrant this? Yet as we have seen from this chapter, there is much to be learned from such creatures and their importance to our ecosystem is paramount. It is perhaps these reasons that inspire these references. It is also perhaps these reasons that led to the following declaration:

إِنَّ ٱللَّهَ لَا يَسْتَحْىِۦٓ أَن يَضْرِبَ مَثَلًا مَّا بَعُوضَةً فَمَا فَوْقَهَا ۚ فَأَمَّا ٱلَّذِينَ ءَامَنُوا۟ فَيَعْلَمُونَ أَنَّهُ ٱلْحَقُّ مِن رَّبِّهِمْ ۖ وَأَمَّا ٱلَّذِينَ كَفَرُوا۟ فَيَقُولُونَ مَاذَآ أَرَادَ ٱللَّهُ بِهَـٰذَا مَثَلًا ۘ يُضِلُّ بِهِۦ كَثِيرًا وَيَهْدِى بِهِۦ كَثِيرًا ۚ وَمَا يُضِلُّ بِهِۦٓ إِلَّا ٱلْفَـٰسِقِينَ (26) (2, 26)

"Surely Allah is not ashamed to give as a parable an insect or something bigger. And as for those who believe, they know that it is the Truth from their Lord; but those who disbelieved say "what does Allah intend by this parable?" By it, He misleads many and guides well many others. And by it, he leaves thereby only those who have strayed from the ways of God" (26)

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Photo and Figure Sources

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