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Comparing The Physiological Function Of Insects And Humans To Explain Their Behavior.

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Abstract
Contrary to the common case When specialists in the field of plant protection talk about insect damage, we will show the important role played by other organisms, Insects have an essential role in pollination, pest control, nutrient cycling, decomposition, and maintenance of ecological balance and health. They are adaptable and have a wide range of genetic diversity, which is driving the growing role of insects in the advancement of some scientific disciplines and in particular their ideal role for studying In the experimental field, drug toxicity, treatments, and interventions for some serious diseases such as cancer, Parkinson's disease.
They share physiological similarities with humans, being like 60% of the DNA code of fruit flies. Both have functions such as the central nervous system, heart, digestive system, reproductive organs, and behavior regulation mechanisms.
And evidence of awareness of human-like insects through interaction with their biotic and abiotic surroundings, and understanding their physiological functions, can provide insight into their behavior in different situations.
Keywords: *Stored insects, control, ecological, balance, physiological, functions, behavior, similarities, genetic, diversity.*

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Insects offer diverse services in multiple sciences, compared to its small size, which made it easier for insects to play this role, their ability to change their temperatures and their food, it was noted that services provided by insects go beyond pollination and pest control, as they also play a crucial role in nutrient cycling and decomposition. For instance, dung beetles help break down animal waste, while ants and termites contribute to soil aeration and nutrient cycling. Furthermore, insects are an important food source for many animals, in fact, insect-based foods are gaining popularity due to their high nutritional value and low environmental impact compared to traditional livestock farming. Overall, the submission emphasized the diverse and essential services provided by insects, highlighting the need for their conservation and sustainable management (Augul & Al-Saffar, 2019; Fresán, et al. 2020; Shah et al.,2021).

Then it has a fundamental role in maintaining the ecological balance for the continuation of life on Earth, an Iraq, especially types of evidence to determine the risks of environmental pollution, and their impact and damage by pollution, and its utmost importance on health and in its environmental and agricultural role, such as its infecting wheat in the field, its damage to stored materials, and its economic losses in the world and in Iraq, especially the types of Tribolium castaneum (Herbst), which are the most harmful compared to other insects. Therefore, it can be said that insects have control over the environment and the life of living organisms (Al-Saffar & Augul,2022).

Despite all the importance mentioned, insects cause problems for humans, animals, and the environment when they are found in the wrong place and time e. For example, mosquitoes can transmit deadly diseases such as malaria and dengue fever to humans, while termites can cause extensive damage to wooden structures. In addition, certain types of caterpillars and beetles can destroy crops and harm livestock. Furthermore, some insects like cockroaches and bed bugs can cause allergies and skin irritations in humans. From an environmental perspective, invasive species of insects can disrupt ecosystems by outcompeting native species for resources (Ahmed, et al. 2021; Fischer & Larson 2019), or sharing it with other pests to create more complex problems such as plant diseases (AL Kuwaiti, et.al,2023).

Which necessitated the use of advanced non-traditional means in combating it using vacuum, plant extracts, and biological resistance of all kinds (Falah, et al.,2020; Mohammed& Nawar, 2020), or use some powders like silica. (Falah & Azhar, 2021)

I. The Role Of Insects In Scientific Progress:

In the field of genetic experiments, insects have used tools and model genetic organisms for more than 100 years, and their genes can be easily altered. Some insects, such as the fruit fly Drosophila melanogaster, have been a powerful tool in studies of genetic, behavioral, and molecular biology (Ojima, et al., 2018).

then insects are model organisms to study a variety of human diseases, including cancer, Alzheimer's disease, and diabetes. Overall, insects are an incredibly valuable resource for scientific research and offer a wealth of opportunities for discovery and innovation. which are good in terms of cost, easy to breed, and short generation period, they are also highly adaptable to various environments and have a wide range of genetic diversity, making them ideal for studying the effects of different treatments and interventions. (Nainu, et al.2022; Mew, et al.2022).

The phenomenon of difference as a general culture for workers in the field of insects has a taxonomic character that sets it apart from other scientific disciplines. The phenomenon of difference also extends beyond taxonomy and into behavior, ecology, and morphology. Overall, the phenomenon of difference is a fundamental aspect of insect biology that drives research and discovery in the field (Rivers& Dahlem,2022).

In addition to the presence of a retrospective dimension that determines the researchers in the study, whether quantitative or qualitative, that makes them not investigate the similarities between insects and humans to explain the behavior of insects, so attention must be paid mainly to sensory systems to focus on the relevant behavioral stimuli. In human psychology, insects use their many senses to search for food, avoid predators, and find mates. To check job similarity, he proposes four basic components of interest: salience filters, competitive selection, top-down sensitivity control, and working memory. So, understand interesting similarities between vertebrates and insects (Nityananda, 2016; Douglas, et.al. 2018).

II. Behavioural Similarities Between Insects And Humans:

The association or social relationship Between individua is one of the aspects of the similarity between insects and humans, and the sounds that one sex makes to the other sex in mating seasons to attract a partner for mating, which are limited to the field of species preservation and push and motivate towards ferocity behaviour's for fighting of both types, attack and the defence to preserve their gains in colonizing the region in terms of land and the environment in all its details(Janson, 2017).

And about insects owning and feeling the environment, and the effect of variables on both insects (invertebrates) and humans (vertebrates) (Abbas& Vinberg,2021)

The question whether insect species' sense of environment is a criterion for consciousness remains complex.

Scientific criteria for defining consciousness are needed, and empirical research into insect consciousness can only be achieved through association.) Overgaard (2021،

Studying consciousness in insect species that differ from humans is very difficult for several reasons, the first is the lack of an empirical method to answer the question, and another reason is that current theories of consciousness differ about the relationship between the physiological structure of an organism and consciousness, and whether consciousness requires a determinant, such as a neural structure, or whether consciousness can be perceived in different ways (Fischer& Larson 2019; Morten ,2021).

III. Physiological Similarities For Insects And Humans

The human brain is characterized by the formation of memories laterally between the cerebral hemispheres, but even the smallest brains, especially in social bees and eusocial ants in Hymenoptera, sometimes bear similarities to it, when wood ants, Formica rufa, store visual memories in their brains, they are similar to humans, because one side of their brain stores short-term memories, while the other side retains them for a longer period to produce lateral memory. For example, although the visual signal is visible to the eyes, it records short-term memories with the right flagellum. Whereas the left flagellum triggered long-term memories (Menzel & Benjamin, 2013; Godfrey,2020).

With the difference in the size and shape of humans and insects in general, there is a lot of similarity between them, and the amount of human DNA code that resembles a fruit fly reaches 60% of the DNA code, which means the most genetic and functional similarity between insects and humans, for example the beetle Chrysochroa fulgidissima , They are very similar to humans, in the type of enzymes secreted by insects and humans, this means that many human genes are similar to insect genes and function very similarly, the functioning of muscle and nerve cells is similar in both humans and insects.(Sun, et al.,2020; Hou, et al.,2021; Semaniuk, et al.,2021),

Flies, crabs, mice, and humans share similar brain functions, with a central nervous system, hearts, digestive system, and they produce feces, and reproductive organs. They all need oxygen, food, and sleep, with

similar mechanisms for regulating behaviors by brain. (Sterling, 2020; Bridi, et al.,2020; Yin, et ;al.,2021), and both structures of the brain derive from similar genetic genes, for example the two structures are similar and "their development is regulated by a whole set of identical genes between them, then the behavioral deficiencies resulting from disturbances in the two systems are similar, and that the organization of our brains and those of behavioral insects indicate an evolutionary origin subscriber (Conboy, ,2017).

This means that from dysfunctional insect brains, we can learn a lot about how disorders of the human brain occur (Loof& Schoofs, 2019).

Another example of the similarity is the distribution of fat bodies in both the bodies of insects and vertebrates, which may sometimes produce hormones (Li et al.,2019), and the brain in both of them consists of neurons that transmit information using chemical and electrical signals, and their advanced age causes them to suffer from many diseases such as cancer and Parkinson's disease resulting from the decomposition of some neurons in the brain or their gradual death as a result of the loss of neurons that produce the neurotransmitter in the brain called dopamine is caused by the interaction of genetic and environmental variables, when comparing the spectrum tuning of photoreceptors in the human brain and fruit fly, we discover that it has one channel mediated by horizontal cells, as the similarity in Parkinson's disease incidence between the two species suggests. Flies can retrieve color information with exceptional precision because to a dual process between insect and human versions of the visual circuit that produces counter-reactions at various wavelengths (Nicholatos, et al., 2018; Heath, et al., 2020; Ganiev& Abdunazarova,2021).

There is also a similarity between them in the physiological function of the mechanism of action of atropine treatment in inhibiting smooth muscles and the glands that nourish them, when it acts as a stimulator or depressant of the activity of the central nervous system and the property of preventing or significantly reducing the toxic effects of carbamate pesticides, by blocking acetylcholine (ACh) receptors. And inhibiting the enzyme cholinesterase (ChE). (Matthew et al.,2016, Xie & Gross, et al.2022).

IV. Physiology And Behavior

Food is crucial to the survival and development of insects, affecting behavior such as migration, cannibalism, early hibernation, and low egg numbers, as in Drosophila melanogaster and Harmonia axeridis (Ahmed, et al., 2015; Saleh, et al., 2019),

Insects adapt to winter hunger by hibernating in various forms, such as eggs, larvae, pupae, or adults., using population distribution or migration blood sugar balance, and fat deposition. to maintain balance and recovery (Zhang, et al., 2019).

This adaptation involves physiological and neurohormonal adaptations (Riffell, 2020; Adamo,2021; Kaczmarek, & Bogus,2021; Honorio, et al., 2021), when the severity of hunger These processes include neurons or neuropeptides, immune-related genes, and levels of autophagy, heat shock proteins, and novelty hormone levels (Teets, et al.,2023),these studies demonstrate the importance of food availability in revealing the adaptation and survival strategies of insects, in the reproduction and release of natural enemies and for the biological control of insects (Culshaw-Maurer et al., 2020),these represent a summary of mechanisms regulating insect tolerance to hunger such as physiological adaptations to sugar intake, neurohormonal adaptations, as well as the larvae of the insect Psacothea hilaris (Coleoptera: Cerambycidae) (Helm, et al., 2017). and larvae of Bactrocera dorsalis (Cong et al., 2015).

In the insect Arma chinensis (Hemiptera: Pentatomidae), starvation pressure led to a lack of ovarian development and a significant decrease in the number of mating's, egg production, and the length of the mating period, and showed a decrease in the hatching rate. These behavioral modifications aim to reduce population size and to ensure adequate food availability for individuals (Feng, et al., 2014; Huang, 2015;Chen, 2013;Zhang, et al., 2017).

Insects and humans are both complex organisms with unique physiological functions that influence their behavior. Insects, for example, have a highly developed nervous system that allows them to respond quickly to changes in their environment (González-Tokman at al.,2020).

They also have specialized sensory organs that help them detect food, mates, and potential threats. In contrast, humans have a more complex brain structure that enables us to think critically and make decisions based on our experiences and knowledge (Šimić, et al.,2021).

Our ability to communicate through language also sets us apart from insects. However, despite these differences, both insects and humans share a common goal of survival. They must find food, shelter, and reproduce to ensure the continuation of their species (Samways, et al.,2020).

This drive for survival often leads to similar behaviors such as aggression when threatened or competition for resources. Ultimately, understanding the physiological functions of both insects and humans can provide insight into why they behave the way they do in different situations (Humphrey,20196).

V. Conclusion:

We conclude there is a link between tissues and the regular and specific effective responses that result from them, Even if they are similar or different Morphologically, and since insects possess 60% of human genetic codes and the same percentage of tissues, here we can bias the interpretation of 60% of insect behavior by comparing it to human behavior, and through it, we can solve many problems related to behavior. Insects that cause damage in the fields, in warehouses, or even in homes. We avoid much of the damage caused by insects, or by using them in integrated insect control.

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Conflicts Of Interest / Competing Interests In Bold).
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