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REST AND RELAXATION

THE SURPRISING SLEEPING HABITS OF INSECTS

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Introduction

Insects are a diverse group of animals that can be seen flying, crawling, and hopping around us all the time. Many of us imagine them as small, lively creatures constantly on the move, but did you know they actually need to sleep. Insects sleep just like us, though in a slightly different manner. Sleep is a fascinating behavioural state with an unknown function. Humans, including kangaroos, tree shrews, hedgehogs, bats, beavers, chipmunks, golden hamsters, gerbils, and rats, spend roughly one-third of their lives sleeping. Sleep is necessary for mammals and insects to function normally. During sleep, animals are isolated from the outside world, exhibiting high arousal thresholds and altered brain activity. AA sleep rebound occurs as a result of sleep deprivation.

What is sleep?

Sleep is a naturally recurring state of the brain and body that can be defined as a behavioural and corporeal condition characterised by a decrease in sensitivity to external stimuli and a shift in consciousness. Sleep is widely regarded as a necessary requirement for all species, including insects. Insects sleep in two ways: quiescence, when an insect is motionless and conserves energy in addition torpor, when an insect completely stops its activities and rests. Many insect species, including bees, moths, beetles, and butterflies, exhibit various forms of sleep.

Torpor is a sleep-like condition in which the physiological activities, body temperature, and metabolic rate of insect remains low. The circadian cycle and homeostasis are the two important systems for controlling torpor. The circadian clock plays a vital role in determining the timing and reorganisation of sleep deprivation and slumber, whereas homeostasis refers to the accumulation of sleep requirements over time. It is required for extinction learning and precise communication, which are required for basic survival and protection against predators in insects.

Sleep in butterflies

Many butterflies have developed superb camouflage, especially on the outside of their wings, so that when they close their wings at rest, they simply vanish. With this on their side, they may simply dangle from the branches like a dead leaf or hang out on a tree trunk. Butterflies, contrary to humans, lack eyelids. This implies that they lack a lot of'shut eye'. Butterfly wings usually get close and settle down more than when they are not resting. There fails to be much information on how long a butterfly needs to sleep to recharge. The length of time a butterfly may rest may vary greatly from day to day due to their reliance on weather and inability to remain active overnight. Butterflies become unresponsive in cold weather. This is due to the fact that they are cold-blooded animals that require warmth for mobility. Another state that is easily confused with sleep diapause. Diapause is a state that insects enter during the winter or when they are forced to wait out adverse conditions.

Monarch butterflies typically migrate in groups (congregate) and travel south with their wings folded at night (Fig.1). They appear motionless as they prepare for the next day's flight. Another advantage of sleeping in a clumped pattern is that the individuals are protected from predators.

Fig. 1. Torpor in monarch butterflies

Sleep in bees

Bees must be cautious about the places they sleep in order to get a good night's sleep. Again, there can be differences with respect to age and bee species. Male solitary bees, unlike female solitary bees, do not sleep with their offspring in their nests. The male bee seeks refuge among the flowers and grass stalks (Fig. 2). For added protection, they grip the end of a twig. This serves as camouflage because they blend in with the plant, deceiving predators, and it also makes this area less accessible to intruders such as ants.

Fig. 2. Resting state of solitary bee

Honey bees are distinct, lack the ability to select their sleeping den because it is determined by their position in the colony. Their colony is frequently divided into divisions, with older or forager bees sleeping on the outskirts and younger bees sleeping inside cells closer to the hive centre. The queen bee, the only female with fully developed ovaries, remains in the centre to ensure her safety. A worker bee may be surprised by nightfall or a drop in temperature and sleep outside before returning with pollen in the morning. Foraging social bees (generally the older workers in the colony) have a fixed sleep schedule. They are active throughout the day and sleep at night in the hive. Foragers have different stages of sleep (lighter and deeper), and when they awake, they can spend a bit of time getting ready or grooming themselves. Meanwhile, the youngest worker bees, whose main duties include cleaning the hive cells, have no fixed sleeping patterns and may take naps at various times during the day.

Sleep in ants

Ants have been highlighted as examples of hardworking, efficient workers. Since ants lack eyelids, they do not close their eyes while sleeping. It is more difficult to rouse sleeping ants with external stimuli. Surprisingly, ants appear to be capable of different types of sleep, with deeper and shallower sleep occurring. The best place for them to rest is inside their nest, where they are protected by other ants and are not exposed. Ants are intelligent creatures that fall asleep by retracting their antennae and remaining motionless (Fig. 3). Sleeping ants are difficult to spot because they do not curl up into a ball or close their eyes. Ants' sleeping habits differ between species and between classes within colonies. It is also dependent on their level of activity. Workers appear to sleep for one to four minutes at a time, whereas queens appear to sleep for up to six minutes. According to a new investigation of ants' sleep cycles, the average worker ant takes approximately 250 naps per day, each lasting just over a minute. That equates to four hours and forty-eight minutes of sleep per day. The study also discovered that 80 percent of the ant workforce was awake and active at any one time.

Fig. 3. Sleeping state of ant

Conclusion

Sleep is a vital biological event, although its purpose remains unknown despite repeated research in insects. The difficulty in recognising the significance of sleep can be traced in part to the many expressions of sleep among different organisms. Some future challenges and prospects of this study is the verification of two major mechanisms (circadian rhythm and homeostasis) in most insect species in order to build an appropriate mechanism or model.

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