PRESS INFORMATION
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Insect Eyes and Iridescence Information - The Royal Entomological Society Garden

Compound eyes and insect vision

Insect compound eyes enable insects to have a wide field of view, exceptional motion detection, and quick responses to their environment. They are a remarkable adaptation that contributes to the success and survival of insects in their natural habitats.

Compound eyes are unique visual organs found in many insects and some other arthropods. These eyes are made up of numerous small units called ommatidia. Each ommatidium consists of a lens, a crystalline cone, and light-sensitive cells called photoreceptors. The lenses are typically hexagonal in shape and are arranged in a mosaic pattern across the surface of the eye. One of the notable features of compound eyes is their wide field of view. The arrangement of ommatidia allows insects to have a broad visual perspective, covering a large area around them. This panoramic vision enables them to detect movements and changes in their environment quickly.

Compound eyes also excel at motion detection. With a large number of ommatidia, insects are highly sensitive to rapid changes in their surroundings. This ability is crucial for their survival, as it helps them spot potential prey, avoid predators, and react swiftly to stimuli. However, compound eyes have a trade-off in terms of spatial resolution. Compared to human eyes, which have a single lens, compound eyes provide lower spatial resolution. Each ommatidium captures a small portion of the visual scene, and the brain combines the input from multiple ommatidia to create an overall image.

Structural iridescence

Structural iridescence is a captivating optical phenomenon observed in many insects, resulting in vibrant and changing colours that are not due to pigments. It occurs when light interacts with intricate microstructures on their bodies, like wings or exoskeletons. Unlike pigmented colours, these are created through light interference, diffraction, or scattering by the microstructures.

The resulting colours are vivid, often with a metallic sheen or shimmering effect. They can change depending on the viewing angle or incident of light, creating dynamic colour shifts. Insects such as butterflies, beetles, dragonflies, ants, and bees use this iridescence for attracting mates, communication, camouflage, or warning signals.

The study of structural iridescence has not only provided insights into insect visual displays but also inspired the development of new materials, such as photonic crystals and thin films, that mimic these natural structures. This is something used in the design of the laboratory that changes the colour of the lab windows according to the angle of the light and viewer.