

# Oriental Hornet: Expert Solar Power Harvester

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Do you know who is the most competent solar power expert, according to a research team from [Tel Aviv University](http://Tel Aviv University)? It is the humble common Oriental hornet found in our gardens! Much to the astonishment of the scientists and researchers, the hornet utilizes [solar power](#) much like a plant and it produces electricity. Think how much easier it would be if only we could unravel how the hornet manages it. This discovery could revolutionize future solar power harvesting.

## **Photosynthesis process**

Plants use the photosynthesis process to harvest energy from the sun. Scientists have been trying to mimic this for energy production, but with limited success. Now with hornet showing how to efficiently convert the sun's rays into electricity, there is hope for other biological and living beings to follow suit and produce electricity themselves. This research opens up a lot of possibilities.

## **Research team**

[Tel Aviv University's School of Physics and Astronomy](#) research team, comprised of Prof. David Bergman, Marian Plotkin and (late) Prof. Jacob Ishay of [Sackler Faculty of Medicine](#). Together they have been busy researching the hornet in an effort to mimic its solar harvesting abilities.

## **Hornet's unique prowess in photosynthesis**

From their research we have learned that the exoskeleton – the outer body shell of hornet, works by converting the abdomen of hornet into tiny solar cells. German journal, [Naturwissenschaften](#), published these newly discovered powers of hornet. Another study has also found that the hornet's biological harvesting capacity is directly proportional to the intensity of the sun.

### **What makes hornets remarkable?**

The researchers were quite keen to learn more about the activity pattern of hornet. What is the most important aspect that makes the hornet more active in the afternoon, where other insects are more active in the earlier part of the day? Considering temperature, humidity and solar radiation, they found that UV B rays are the reason for the hornet's activity level increasing along with sun's intensity.

### **The photovoltaic pattern**

The hornet has some really astonishing brown grooves to split the light into diverging beams. The brown and yellow bands absorb the radiation from sun. While the brown splits the light, the yellow pigments convert it into electricity. In the small pinhole depressions, there is xanthopterin – a pigment which along with the grooves in the brown bands and pinhole depressions makes electricity from sun rays. The outer shell locks in the light which is converted to power by the pigments.

### **Unique characteristics of the hornet**

Along with harvesting solar power, the hornet has its own built-in top quality heat pump structure in its body, which is tuned to the highest grade of efficiency. While it gets more and more busy in the hot afternoon sun, it keeps its body cool – a rather difficult thing to do. The acoustic prowess of hornets guides them to build nests in total darkness but with remarkable accuracy and exactness.

### **Duplicating the hornet**

Though the researchers tried to duplicate the hornet's body structure in an effort to harvest solar energy for electricity production, they have yet to find success. Efforts are still ongoing to refine the model and seek better ways to emulate the hornet for power solutions. Let us hope that a successful prototype is soon realized, so we can harvest renewable solar energy as effortlessly as the hornet!

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