

Insects provide valuable look into genetics of how societies are built

Eusocial insects are among the most successful living creatures on Earth. Found in terrestrial ecosystems across the globe (on every continent except Antarctica), the world's ants alone weigh more than all vertebrates put together. Bees are key pollinators of major crops as well as many other ecologically important plants. Termites construct thermoregulating homes that can dominate the landscape, and that are inspiring new energy-efficient skyscraper designs.

The organization and collective decision making of eusocial insects is even yielding new insights into human behavior and what it means to be part of a society. But one of the biggest unanswered questions in our understanding of these complex insect groups is how a single genome can produce such diverse and contrasting physical and behavioral forms, from egg layers, provisioners, and caretakers to soldiers.

We are now entering a new era of research into eusocial insects. For the first time, scientists are investigating the molecules that underlie eusocial behavior at a depth that was previously unimaginable. New, affordable sequencing technologies enable scientists to examine how genes across the entire genome are regulated to generate different caste phenotypes, the roles of DNA methylation and microRNAs in this differential expression, and what proteins are synthesized as a result.

This burgeoning area of research, dubbed “sociogenomics” in 2005 by Gene E. Robinson, is revolutionizing our understanding of the evolution of eusociality from a solitary wasp-like ancestor to the million-strong colonies we see today. New work is yielding insights into how genomes interact dynamically with the physical and social environment to produce highly adapted, specialized castes with remarkable phenotypic innovations. These findings are, in turn, illuminating the importance of gene regulation and epigenetics in controlling behavioral plasticity across the animal kingdom.

Read full, original article: [The Genetics of Society](#)