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1388

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1392

LETTERS | BOOKS | POLICY FORUM | EDUCATION FORUM | PERSPECTIVES

## LETTERS

edited by Jennifer Sills

Creating a Buzz About  
Insect Genomes

WHEN E. O. WILSON PROCLAIMED THAT INSECTS ARE THE “little creatures who run the world” (1), he was simply reaffirming the long-recognized dominance of the largest class of animals on our planet. Insects constitute approximately 53% of all living species, with one group alone (the ants), accounting for almost a quarter of terrestrial animal biomass (2). These tiny creatures also exert outsized impacts on human affairs. By serving as pollinators to more than 75% of flowering plant species (3), insects are essential to the maintenance and productivity of natural and agricultural ecosystems. But other insects consume or damage more than 25% of all agricultural, forestry, and livestock production in the United States, costing our economy more than \$30 billion annually (4). These losses occur despite more than 150 years of concerted efforts to prevent them. Insects and other arthropods not only affect our food supply, they also carry disease. Parasites and pathogens carried by insects and their relatives have led to more loss of human life than all wars in recorded history; even today, insect-borne diseases are a leading cause of death of children under the age of 5 (5). The annual cost of vector-borne diseases worldwide is estimated at almost \$50 billion (6). Clearly, our health and well-being depend on our ability to understand and manage arthropods of agricultural, medical, and veterinary importance.

In the past decade, biomedical research has increasingly relied on information obtained from sequencing the human genome, and early genome-enabled successes have inspired a new vision of genomic medicine (7). We believe that genomics also can improve our lives by contributing to a better understanding of insect biology and transforming our ability to manage arthropods that threaten our health, food supply, and economic security. Because of the overwhelming diversity and abundance of insects, achieving these goals will require a project of grand scale.

Therefore, we, the undersigned, are pleased to announce the launch of the “i5k” initiative to sequence the genomes of 5000 species of insects and other arthropods during the next 5 years (8). This project is aimed at sequencing and analyzing the genomes of all species known to be important to worldwide agriculture and food safety, medicine, and energy production; all species used as models in biology; the most abundant insects in world ecosystems; and, to achieve a deep understanding of arthropod evolution, representatives of insect relatives in every major branch of arthropod phylogeny. The i5k initiative will be broad and inclusive, seeking to involve scientists from around the world and obtain funding from academia, governments, industry, and private sources. We also aim to encourage new collaborative research by computer scientists, bioinformaticians, and biologists to overcome the challenges of handling



this unprecedented volume of data and derive meaning from these genomes.

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## References and Notes

1. PBS, Nova, Transcripts: “Little creatures who run the world” ([www.pbs.org/wgbh/nova/transcripts/2203crea.html](http://www.pbs.org/wgbh/nova/transcripts/2203crea.html)).
2. E. O. Wilson, *The Diversity of Life* (W.W. Norton, New York, 1992).
3. National Research Council, Status of Pollinators in North America (National Academy of Sciences, Washington, DC, 2007).
4. D. Pimentel, Ed., *Pest Management in Agriculture: Techniques for Reducing Pesticide Use: Environmental and Economic Benefits* (John Wiley & Sons, Chichester, UK, 1997).
5. J. Bryce, C. Boschi-Pinto, K. Shibuya, R. E. Black, WHO Child Health Epidemiology Reference Group, *Lancet* **365**, 1147 (2005).
6. World Health Organization, Global Health Observatory Database (<http://apps.who.int/ghodata/?vid=72063#>).
7. E. D. Green, M. S. Guyer, *Nature* **470**, 204 (2011).
8. We invite individuals to suggest species for sequencing and to alert us of pending and ongoing insect genome projects. Please visit [www.arthropodgenomes.org/wiki/i5K](http://www.arthropodgenomes.org/wiki/i5K) to provide your input.

## Letters to the Editor

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