'Off-the-shelf' equipment used to digitize insects in 3-D

April 23 2014

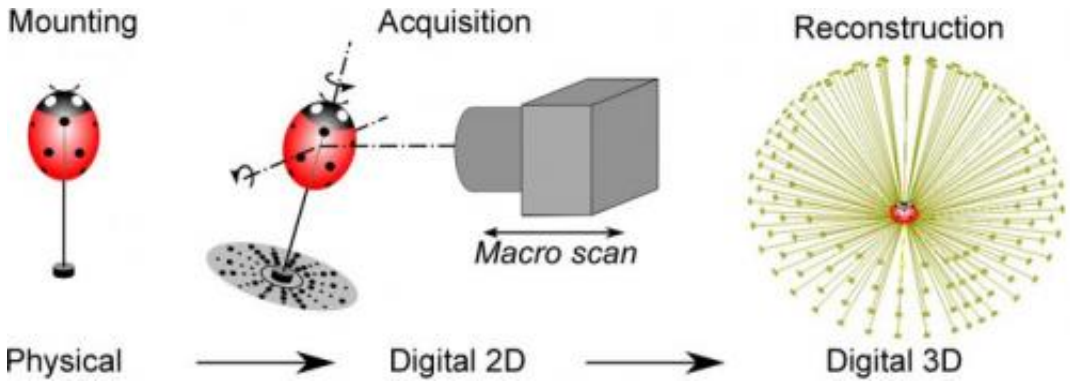
This is a Various Insects photograph versus 3D model. Credit: Chuong Nguyen

Scientists have developed a cost-effective, off-the-shelf system to obtain natural-color 3D models of insects, according to results published April 23, 2014, in the open access journal *PLOS ONE* by Chuong Nguyen from CSIRO in Australia, and colleagues.

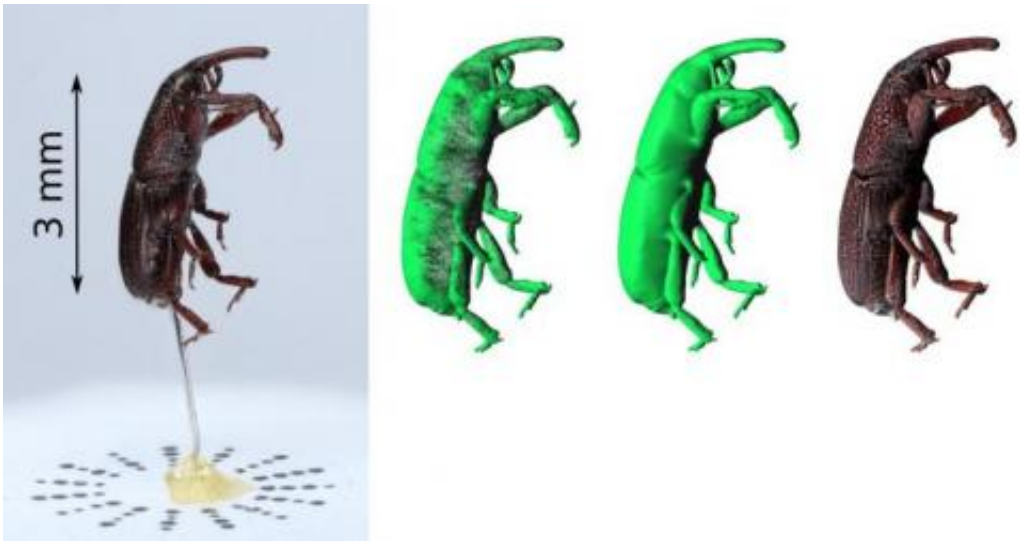
Scientists studying insects rely on collected specimens that are often shared between scientists through written descriptions, diagrams, and

images. These 2D tools are important in understanding and sharing specimens, but they often lack the precise detail of the actual 3D specimen. The authors of this study, interested in understanding the feasibility of digitizing insects for research purposes, created a cost-effective prototype to produce 3D naturally colored digital models of medium-to-large insects (3 to 30mm in length), using off-the-shelf equipment and software. The prototype captures color images from different angles and focal depths using a digital single lens reflex camera and a two-axis turntable. These 2D images are then combined into 3D reconstructions.

The resulting 3D models are compact (around 10 megabytes each), have excellent optical resolution, and can be embedded into documents and web pages, as well as viewed on mobile devices. The authors suggest the system is portable, safe, relatively affordable, complements existing imaging techniques, and reduces the need to handle or ship delicate insect specimens. Furthermore, they hope that this technology opens new opportunities and applications for research data collection, education, art, entertainment, biodiversity assessment, and biosecurity control.



The shows the three main steps to create a natural-color 3D model of specimen. Credit: Chuong Nguyen,10.1371/journal.pone.0094346



This is a wheat weevil photograph versus 3D model. Credit: Chuong Nguyen, CSIRO Computation Informatics

More information: Nguyen CV, Lovell DR, Adcock M, La Salle J (2014) Capturing Natural-Colour 3D Models of Insects for Species Discovery and Diagnostics. *PLoS ONE* 9(4): e94346. DOI: 10.1371/journal.pone.0094346

Provided by Public Library of Science