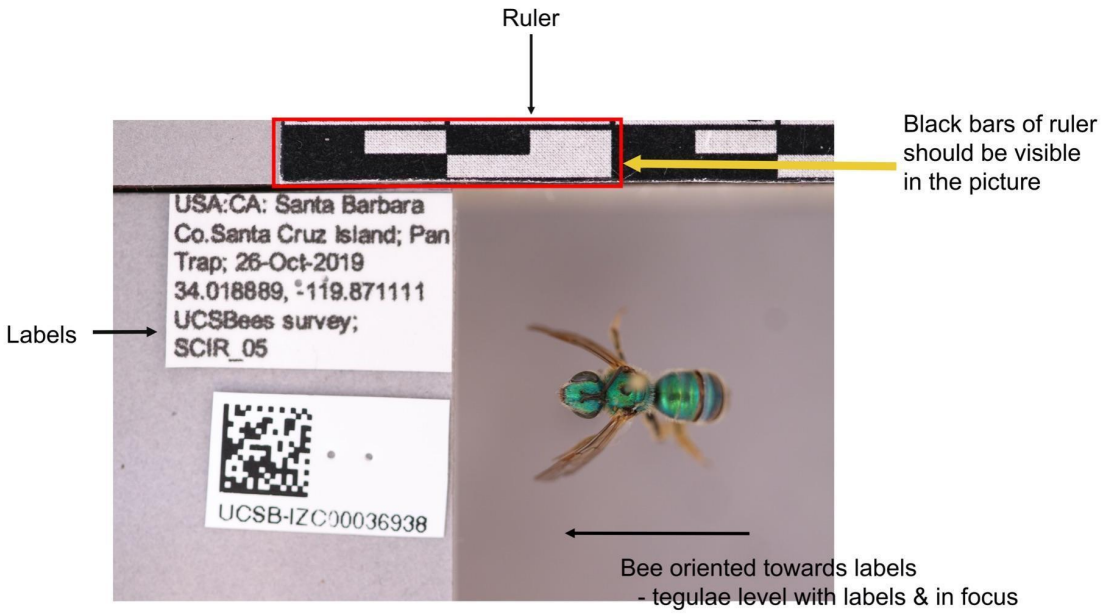
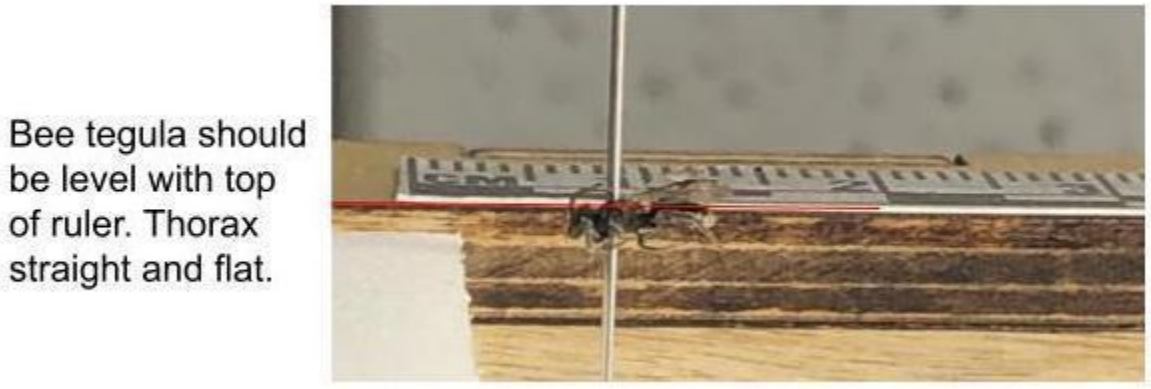
Big-Bee Specimen with Label Imaging Requirements

Different institutions will be imaging using different systems. Still, no matter what system you use, there are a few things that each image needs to include.



The image should include the ruler, specifically the bottom black bars. The image should be taken with the ruler at the top, labels at the left side (positioned so they are readable), and the specimen to the right. It should have a neutral grey background (especially for dark bees).



The bee should be dorsal and the bee tegula should be level with the ruler with both tegulae visible from above. The bee thorax should be straight. This positioning is important for doing measurements from the images later. It helps to view the bee and ruler from the side to see if it is level.

Other Requirements

- Images should be taken at the highest resolution possible with your imaging system for more accurate ITD measurements. The minimum required size is 900kb. 4000 x 3000 pixels, ~4-5 mb is ideal.
- Higher resolution images are also better for Optical Character Recognition (OCR) applications. Hi-Res images can be cropped to just the labels.
- Images will need to be JPGs to upload to the Bee Library.
- Notes from Nature prefers JPG images with file sizes less than 1mb for transcription. In practice this could be 1600 x 1200 pixels at 180dpi.

Workflow Considerations

Dorsal bee views are one of our Exemplar views (Focus-stacked images in the table below). An additional photo of the bee and ruler zoomed in further for small bees would be useful for measurements.

File Naming Conventions
Image names should follow your standard in-house protocols for file naming but must include the full catalog number.

Abbreviations in the file name will be changed in the Bee Library to specific tags for finding and searching for images. This is a list of supported tags that can be added to filenames to automatically tag images. Abbreviations must contain an underscore character on either side of

the filename or be between an underscore and the period. for the tag to be created automatically.

Examples:
ASUHIC0173816_3x_shortdescription_had.jpg
UCSB-IZC00009199_had_lbs_3x.JPG
UCSB-IZC00028367_3d_2020-08-07-15.12.44.jpg

Abbreviation for Image File Name	**HumanReadable**
had	habitus, dorsal view
hal	habitus, lateral view
hav	habitus, ventral view
lbs	labels
win	wing
hed	head, dorsal view
hef	head, frontal view
hev	head, ventral view
leg	leg
thd	thorax, dorsal
thl	thorax, lateral
thv	thorax, ventral
abd	abdomen, dorsal
abv	abdomen, ventral
abl	abdomen, lateral
3d	an image that is part of a 3D image
imt	image has typed or printed text
imh	image has handwritten label text
hab	image of habitat
det	image contains determination label
	there is a problem with this image

Institutional Commitments

The number of “Digitized Specimens” in the table below is the number of specimens with label images for each institution.

Digitizing institution	Digitized specimens	Focus-stacked images	3D image suites	Additional Images
Arizona State University (ASUHIC)	10,000	0	0	
California Academy of Sciences (CAS)	142,325	5,474	500	
Florida State Collection of Arthropods (FSCA)	90,495	5,294	500	
Harvard University (MCZ)	52,324	6,492	500	
Karlsruhe Institute of Technology (KIT)	2000	0	0	2,000 (microCT)
Natural History Museum of Los Angeles County (LACM)	72,681	6,543	500	
San Diego Natural History Museum (SDMC)	14,224	797	3,000	
University of California-Berkeley (EMEC)	69,297	9,892	100	
University of California, Santa Barbara (UCSB)	8,697	5,092	4,000	
University of Colorado (UCMC)	62,677	10,160	100	
University of Kansas (SEMC)	9,495	28,185	100	
University of Michigan Museum of Zoology (UMMZI)	27,815	15,198	500	
University of New Hampshire Collection of Insects and Arthropods (UNHC)	6,783	12850	500	1,000 (CLSM)
USGS Native Bee Inventory and Monitoring Lab (USGS BIML)	4000	4,000	0	
Total:	**572,813**	**109,977**	**10,300**	**3,000**

Table 1: Digitization goals including publishing 572K specimens digitized using multiple imaging modalities; 109K high-resolution, focal stacked exemplar and diagnostic images; 10,300 3D image suites consisting of ~64 focal stacked images per suite; and 3,000 CT or CLSM images. Grey highlighted rows are non-funded partners.

Batch file renaming and file conversion software options

- IrfanView (https://www.irfanview.com/)
- Adobe Lightroom (https://www.adobe.com/products/photoshop-lightroom.html)
- Or Adobe Bridge (https://www.adobe.com/au/products/bridge.html) (Free)