

Jim Cane: (James H. Cane)

Native bee and pollination ecologist Emeritus USDA-ARS Bee Lab, Logan, Utah
owner - WildBeeecology

Jim Cane has spent many of the past four decades studying the nesting and pollination ecologies of native non-social bees of North America and elsewhere. He has studied pollination and pollinators of alfalfa, cranberries, blueberries, squashes, almonds, onions, and raspberries, as well as 13+ native wildflower seed crops used for restoration seed. He has published on native bee nesting biologies, chemical ecologies, foraging behaviors, floral specializations, community dynamics and conservation, especially with regard to wildfire. He has multiplied 5 species of native *Osmia* bees for these applications.

For the past 20 years, he worked for the US Department of Agriculture at the Pollinating Insect Research Unit at Utah State University in Logan, Utah. Prior to that, he was on the faculty of Auburn University in Alabama and a post-doc at Berkeley following a Ph.D. from the University of Kansas. For Oregon, he and his student recently published the definitive studies showing that raspberry flowers are fully pollinated with just two visits by any of several managed bees. For one of those bees, *Osmia aglaia*, he developed a nesting system that he used to multiply and maintain 1000's of these bees on several raspberry farms in the region. He has also helped Jim Rivers and Sara Galbraith with their studies of native bees in the years after the huge Douglas Complex forest fires. And lastly, he has enjoyed several interviews with Andony Melanthopoulos for his popular PolliNation podcast.

Current research includes:

1. Studies of responses of resident native bee communities to recent wildfire, and of big Great basin fires, and experimental demonstration of heat tolerances of life stages (with graduate student Byron Love).
2. Pollinating bees of cultivated raspberries and blackberries, including on-farm sampling of floral guilds, comparative evaluations of bee species' pollination efficacies, and management of two alternative pollinators, *Osmia aglaia* and *O. bruneri*, for use in the PNW and Rockies, respectively (with graduate student Corey Andrikopoulos).
3. Ongoing research with the alkali bee, *Nomia melanderi* and its propagation and persistence as a managed alfalfa pollinator.
4. Mass-multiplication of alfalfa leaf-cutting bees on CRP land planted to legumes to improve growers' self-sufficiency for supplying this bee for alfalfa seed production.
5. Discovery of new pollen-collection and pollen carry-over mechanisms of bees in the genus *Osmia*
6. Quantifying reproductive consequences of floral resource competition between honey bees and native bee communities in wildlands
7. First comprehensive quantification of pollen diets of adult bees (using *Nomia*, collaboration with Heidi Dobson), and experimental demonstration that, without dietary pollen early in their adult life, female *Osmia* are unable to mature oocytes and reproduce.
8. Collaborative research for recovery of the endangered Packard's milkvetch, characterizing bee faunas, pollination efficacies, and benefits of augmenting native *Osmia* bee populations and alternative floral hosts for pollinators.
9. Protein content of bee eggs.
10. Microclimate and aspect effects of wintering temperatures across an altitudinal transect for survival and emergence phenologies of *Osmia* bees nesting in tree snags
11. Squash bees (genus *Peponapis*) as effective pollinators of cultivated squashes, including efficacy trials, a national survey of their prevalence, and their Holocene range expansion (collaborating with Margarita Uribe-Ortiz).