

Audio Bee Booths & Cabinets FAQ

Bee Booth Care Guide available upon request
(June, 2015 2 pages)

Is this a temporary or permanent installation?

The booths attract local insects which are meant to aggregate over several years, and moving insects beyond your immediate locale is to be avoided due to pathogen transmission issues. Thus, booths are permanent installations. A booth doesn't need to be cemented into place, however ; it can be moved around your vicinity from year to year, should you wish to explore different locations or ecosystems nearby. A booth should last 10+ years.

What is the required habitat for a bee booth or cabinet?

Adequate outdoor area which can provide abundant east- or south-facing light; pollen and nectar resources which bloom successively from Spring to Fall, such as neighborhood gardens or nearby parks with gardens, or naturalized areas. Supplementing the site - right next to the installation - with downfall from the vicinity (bark remaining on the wood) is strongly suggested, as it often contains solitary bee and wasp pupa from the previous year (s). Lack of pesticides or other toxic materials in the vicinity (auto pollution does not seem to be problematic). Relative quiet a plus for listening and/or videotaping. Expect 20% - 80% habitation within the 1st year if set up before mid-Summer. Nesting yield of any locations may vary widely due to many circumstances which may be difficult to fully assess. Solitary bees and wasps do not necessarily live where they forage, although fewer solitaries in general live in shady, wooded areas.

Viewing: Please use triplet or other loupe (geologist's) type lens or other magnifying lense (or strong reading glasses) **while listening** (with headphones provided or BYO). This is essential to perceiving characteristics of aspects of physiology and behaviour of, and materials used by of solitary bees and wasps. This is the viewing environment for which these installations have been designed, and we believe that the fidelity of one's perception is enhanced by **viewing combined with listening at a magnified level.**

Audio

Headphones provide a thoroughly intimate and detailed listening environment which may be volume-adjusted, as wasp noises can be comparatively loud. Audio output for headphones consists of one (mono) channel per microphone to both right and left ears. For 2011 booth models, sound may be switched between the 2 embedded vibrational sensor (microphones) which are distributed evenly within each nest plank (all later booths have only 1 transducer per nest plank). Although each sensor can convey the contents of an entire plank, nuances will be conveyed as the nest bores become filled with inhabitants and thus each sensor will more closely convey nuances of insect location and movement - such as newly emerging bees chewing out of nest capsules, or bees depositing resin or creating pollen balls. **Loudspeakers:** there are none. Given the subtle nature of most insect sounds versus ambient environments which usually dominate, loudspeakers cannot convey these intimate listening environments effectively. However, where loudspeakers are requested, they will be situated where audio feedback between the internal vibrational sensors and loudspeakers will not be an issue.

Safety and stings: Solitary bee and solitary wasp populations near *The Audio Bee Booth* are much the same as normally present in the environment, and as such persons with allergies should take the same precautions as in any outdoor situation. All bees in upper North America, including solitary wild bees, bumblebees (native bees which are social) and honey bees (non-native, managed) are by nature non-aggressive to people and are not interested in human food of any type, but rather forage for nectar and pollen exclusively (the majority of Canada's 800-plus species of bees are solitary). The same is true for solitary wasps, except that they prey only upon aphids, grasshoppers and other insects. Thus, these pollinators will not take an interest in people observing their foraging or nesting activities and will only sting if accidentally stepped on or handled. Long-sleeved shirts and pants may be worn to prevent accidental entrapment. Solitary bees and wasps have varying degrees of sting potency (some very mild); accidentally squashed solitary bees/wasps do not alert others to the 'defense', as they do not work together in a group.

Non-toxic materials

The type of marine-grade plywood we have chosen for the cabinetry, Okuomi FSC ply, is not toxic to insects. Bee nesting planks are constructed without glue and are made of non-treated wood of various hard wood species; all bark is removed. No toxic glues or other substance which off-gas chemicals toxic to insects, insect brood or humans are used.

Details/FAQ for The Audio Bee Booth and similar (continued)

Housing details

The Audio Bee Booth consists of a roofed wooden cabinet supported by four steel angle iron legs which are driven into the ground and anchored by a cinder block or similar. The cabinet contains 2 bee nesting planks - routed wood panels vertically positioned for viewing from the side, in cross-section. Each plank is drilled with multiple bores of varying diameters, on both sides of the plank, which are covered with plexiglass; embedded industrial-grade vibrational sensors (transducers acting as microphones) transmit sound which is amplified for headphone listening.

Bees enter and exit the planks from the booth's front side. Doors on each side of the booth allow easy and unobtrusive access for viewing activity within one side of each nest plank (and provide essential darkness and dryness for nesting when closed). A back door provides access to view the other side of each plank via the cavity within the booth. Below the back door, a lower compartment houses an electronics enclosure (not accessible to the public) and supplies an audio interface: 2 headphone jack inputs, volume controls and "on" switch; power automatically shuts off after 10 minutes. Reading glasses and hand-held magnifying lens may be stored inside the booth (through the back door), and, hooks for hanging headphones may be attached where daily monitoring is provided (removing during rain, etc.).

An open compartment above the nesting planks provides space for loosely assembled additional nest materials - such as drilled wood free of detritus, bamboo tubes, etc. - to help attract local solitaires to the booth. A solar panel is mounted on the roof. Cabinetry is weather-resistant FSC marine grade plywood. Electronics housing is weather-resistant and is accessible for repairs and removal / replacement of the solar battery. Please see the Bee Booth Care Info guide for details.

Images, videos : [Audio Bee Booths](http://www.resonatingbodies.wordpress.com) at the resonatingbodies.wordpress.com site.

Installation and wind stability for Booths

It's a good idea to stabilize the booth beyond just sinking the angle iron legs into the ground. If not using cement, we recommend bolting a threaded rod from one of the front legs to one of the back legs at ground level, threaded through a cinder block. Sites with very compact gravel may require digging a hole and placing the booth with the cinder block slightly below ground level, and buried the block. Where the ground is solid dirt, one can simply place the threaded cinder block on the ground and cover with earth or other visually suitable materials. The booth may thus be moved to another site location nearby if uninhabited after the first year. Please see the Bee Booth Care Info guide for details.

What is the life expectancy and maintenance requirements (see also CARE guide)?

Expect 10 – 20 years of use, as the booths are made using marine-grade plywood. Periodic electronics repair may be required, where parts fail unexpectedly (we can assist where necessary). **Battery:** Although electronics maintenance is not anticipated, the re-chargeable battery which interfaces with the solar panel will need replacing every 2-5 years (cost is about \$20). The battery is a 12v 3.2 Amp-Hour sealed lead acid battery. A suitable replacement is part number KLA132 from Active Tech. (www.active123.com). Any similar battery with a capacity between 2 and 3Amp-hours can be substituted. (The solar panel alone does not deliver sufficient power to the audio amplifier). **Winter:** The re-chargeable battery must be removed and stored in a warm place during Winter months where temperatures drop below freezing (removing the battery is not difficult, although it is not accessible to the public). The battery should last several years in normal use, provided that it is protected from freezing. The booth and its inhabitants should be left in place and securely wrapped in tarp after the first frost; it should be unwrapped early Spring (early April in Southern Ontario). **Pathogen control:** Pathogens detrimental to bees and wasps are naturally present in the environment and build-up over time. Swapping new (or cleaned) bee nesting planks with older ones periodically is necessary (estimated every 2-3 years per plank, depending on your environment). Bee nesting planks can be removed to interchange with new planks. The cleaning process is relatively easy. Insects in used planks should be allowed to emerge and leave on their own via a dark box provided by the venue. For details see xerces.org fact sheet, "[Tunnel Nest Construction and Management](#)". Please see the Bee Booth or Cabinet Care Guide for details.