MASON BEES: MYTHS, & BEST PRACTICES

We need to remember how we manage Mason Bees is unnatural and artificial. This means we need to follow best practices regarding sanitation procedures, breeding, summer/winter storage, and pest management to keep our bees healthy. We must be willing to change as we learn better ways to help our bees. What we do must be for the bees not our convenience and if we are not willing to do, we should not try to breed bees.

MYTHS & WEB TALES: None of the following are true.

- Mason Bees will replace Honey Bees.
- All flowers are good for bees.
- All bees sting.

BEST PRACTICES:

- What is your purpose or desired results?
- Multiple releases of cocoons are more effective than releasing them all at once. Multiple releases are more likely to 'weather' future weather issues. Releases should be at least 20 cocoons, 30 is better.

If you have fruit trees, Mason Bees are beneficial way to increase the number and quality of the fruit produce your fruit trees. We manage Mason Bees to produce healthy bees, to increase their population, and to pollinate our fruit trees and other plants.

WHO NEEDS TO CLEAN, WHAT YOU WILL SEE DURING CLEANING?

- Mud walls make up the cell chamber holding the egg.
- The bee's frass (poop) looks like black sprinkles.
- Pollen balls (sticky when rubbed between your fingers) left when for some reason the bee larva died.
- Larva of dermestid beetles, and other pest of Mason Bees.

If you have had Mason bees in the past and you have experienced mites and/or chalk brood fungus infestations, you should follow the best practice for dealing with these pests/pathogens. If you have not experienced these pests/pathogens, you are lucky and following the best practice for dealing with these pests/pathogens would be a wise practice to follow.

CHALK BROOD: CONTROL AND MANAGEMENT OF

If you have larva that died due to the fungus- chalk brood, this is a critical issue you should deal with as soon as possible. The problem is when you see a dead larva you cannot tell if it was chalkbrood that kill the larva, so it is wise to treat dead larva as if they were killed by chalk brood and to treat for it. Chalk brood affects the Mason Bee during the larval stage. The larva will be dried out and mummified. Do not open dead larva because if chalk brood is responsible for the larva's death you will spread the fungus even more. Take these extra precautions when you find dead larva. **Stop**. Clean all surfaces and tools with a bleach wash or disinfectant spray before cleaning more cocoons or use new cleaning tools. Change your gloves if you are using them. Also, you must now wash these cocoons with the bleach wash before you store them for the winter. Do not use a sand wash to clean these cocoons. If you are using the bleach wash for your cocoons you can put all your cocoons together for the bleach wash. If you take a short cut and do not follow these procedures, you will spread chalk brood.

People ask me "Should I sand washing my cocoons?" Sand washing will remove mites, but chalkbrood (a fungus) can be spread by sand washing if you have it in your breeding system. You may think "I am going to wash with bleach why bother worrying about spreading chalkbrood?" During our harvesting classes I have

watched some participants clean cocoons in a manner where if they missed finding chalk brood hiding in piles of dirty cocoons, dried mud, mites, and other debris they have now spread it throughout their Mason Bees. I think the best way to prevent the spread of chalk brood is to do a preventative treatment for it. You should also clean all you bee equipment blocks with bleach for the same reason. This gives your bees a better chance at a healthy start.

Sand Wash Method**:** I will not support sand wash for two reasons: if you have chalkbrood in your nesting system the process of harvesting will likely contaminate your batch of cocoons and other debris, and unless you properly sanitize your tools and all other equipment such as your hands, table blocks tubes. You may spread it to any future cocoons you harvest and to any block/tubes you put out the following season. Sand washing does not sanitize chalkbrood, but it does spread it. Sand washing will likely spread spores to many or every cocoon you use sand washing on even if you replace the sand each time you do the washing. Even if you bleach wash the cocoons and other debris before you do the sand wash, if there is an infected dead larva that remains intact till it breaks open during the sand wash you have contaminated the sand wash system. The second reason is in our EM-9130 **"Nurturing Mason Bees in Your Backyard in Western Oregon"** in the section on cleaning, it states "Handle the cocoons gently while cleaning. Rough handling may damage the adult mason bee inside." I have watched numerous web videos on sand washing and would not subject my bees to any of those very physical tumbling methods inside a jar full of sand. I also have not seen any experimental data that has supported sand washing to eliminate the mite numbers much less reduce them. I am still not sure to what level we need to reduce the mites so they would no longer be a pest, but my experience is that it would have to be exceptionally low.

MITES: CONTROL AND MANAGEMENT OF

Pollen mites are small and hard to see, what you will see is a yellowish powdery pile, this is the cast skin of the mites. The mites are small and white almost transparent.

- Getting Cocoons out of liners and laminated blocks
- Use tool to gently LIFT the cocoons out of laminated blocks.
- Washing the Cocoons 2 tsp bleach- one gallon water- 2 minutes
- Remember the only reason we bleach wash the cocoons is to control pest and pathogens not to clean the mud off.
- After you have rinsed cocoons, put the cocoons on a paper towel(s) and let the cocoons dry for about 1 hour or till dry to the touch.
- DO NOT dry in direct sunlight. Place cocoons into wintering trays/boxes in a layer that does not exceed 1" with air gaps between the other trays. Small cardboard boxes, 1.5" tall, make good wintering boxes.
- DO NOT place cocoons in airtight plastic containers.
- A critical change in my method for mite management which I am still doing more research on is I am using small amounts (a couple of drops) of 'Dawn' dish detergent in the bleach water I am cleaning the cocoons with. The mites are not drowning because they are hydrophobic which protects them from becoming 'wetted' with liquids such as water and bleach. I thought that using dawn to break the surface tension I could then drown them. This 'Dawn' method works. It is still important to use bleach to help keep chalkbrood in check. Right now, I am still working on how much raising is necessary to remove all the 'Dawn', so traces of 'Dawn" do not harm the cocoons.

HOW WE ARE SPREADING THE MITES:

Another issue we need to address and one I spent time thinking about to deal with is that we have an increasing mite problem. One of the major causes I believe is because we do not 'clean our nesting systems and the supporting equipment each year whether its blocks, tubes, equipment, or anything else. I have seen

mites carry over on the nesting system because our current methods do not kill the mites on the nesting system. I have heard this from others who breed Mason Bees on a large scale (50,000 or more cocoons)

Let me explain just how hard these mites are to kill. A couple of years ago I took 7 grooved wooden plates that I had stored in zip lock bags from several different bee blocks stored in my bee refer to check on the mites. I had been leaving plates in the refer for different length of time. These 7 plates were from the spring/ season of 2018 and have been setting in the refer since Sept of 2018. Sixteen months later (fall of 2019) after the female bees laid the eggs in spring of 2018, I took 7 plates out to check for live mites. Five minutes after removing the plates I checked for live mites on the grooved plates with my scope. I saw hundreds of live mites starting to move around. I saw live mites on every plate I looked at. This is what we are facing, and I fear going to be a major issue as we continue to spread the mite around.

DEALING WITH OTHER PESTS

- Good" cocoons" will be firm to touch and dark gray in color. Parasite cocoons are usually lighter-colored and seem to be empty. Diseased cocoons may be misshapen, shriveled, or just look "off."
- Put abnormal cocoons in a separate container with a clear lid. Store the container of questionable cocoons in a cool place (unheated garage or shed?) In the spring, bring it indoors and keep at room temperature. Insects will develop and emerge in their own time. (Be sure the edges of the container lid is escape-proof for insects much smaller than a fruit fly--tape the edges of the lid.)
- If the tiny parasitic wasps emerge, refrigerate container for about half an hour, and destroy the wasps before they warm up enough to escape. There may be several dozen wasps in one cocoon.
- If cocoons contain mason bees, cool down in fridge as above, and release bees outside.
- Keep yourself up to date and educated about your bees; follow sites such as LCMGA Bee Notes and or take their classes given in the fall each year.

TIPS:

- Soaked tubes unravel and release cocoons.
- One type of nesting material used for mason bees is cardboard tubes. They are attractive to mason bees.
- Cardboard tubes can be re-used if they are clean. Freeze them. Tubes do not provide protection against parasites and predators.
- All cardboard tubes are not created equal. It was originally thought that thick-walled cardboard tubes would prevent parasitization of the bees. We soon found out that even cardboard tubes 40/1000" (4mm) thick could be parasitized. It is now evident that these parasites can be reduced by using net bags & other means in the summer and candling at time of harvest.
- Most cardboard tube will unfurl or at lease soften up making it easy to open them if they are soaked in water.

NESTING SYSTEMS

The “Hole truth” about the bee’s house

Many of us provide wooden blocks and/or Kraft paper tubes for our bees. Most are good but problems arise is when the blocks are reused year after year and not kept in good shape. This can be harmful to the bees.

So, what is a Mason Bee hole? A Mason Bee will use natural or artificial holes. Mason Bees have used holes they find in trees, under your house shingles, holes in masonry or siding, fence posts, as well as holes we provide. She will use just about any hole anywhere that she can fit into. You can make the holes of whatever material you chose, including holes in wooden blocks, paper tubes with liners, cuttings of reeds,

teasel, or other materials. If the hole is short, the female can either lay female or male eggs. If the hole is big enough for more eggs to be laid, the eggs that become females are usually placed at the back with male eggs nearer to the front of the hole.

How does she find her hole? Landmarks get her to the general area of where her hole is. Then she seeks to detect the pheromones she used to mark her hole. If there are many holes close together and they are not marked with any visual landmarks, you may see a Mason Bee enter a hole and then quickly leave it. She has detected a pheromone that is not hers and it is not her hole.

Wooden blocks if used as your 'hole' system should be designed to be taken apart so the holes can be cleaned and sanitize. If you are using paper tubes with liners, reeds, teasel, or other hollow plants stems that are sealed/closed these are what we call 'one time use'. This is an effective way to minimize pest and pathogen issues. Another reason to use these types of material is that moisture can escape from these materials. **Do not use newspaper.**

- If your system has cracks or gaps in the blocks or the backing you may be providing a pathway for the mites and other pests to attack your bees in other holes.
- Do not use foam, cardboard of any other material to seal the bottom of the blocks and the back plate. The materials will leave gaps or cracks that you may not see.
- If your block can not be tightened or squeezed to close off any gaps or cracks, consider using liners in each hole that has a gap or crack or replace the block.
- My choice of backing is foil tape. Yes, its sticky but that is why it seals the holes and gaps between your block and the back plate a critical result you want to achieve.
- A flash light may help you see the cracks and gaps.
- If you are not sure if the hole/tube is being used, you can use a small twig/straw that when placed into the hole will tell you if the hole is empty or partly filled.

If you are not sure that the female bees are using the hole/tube, you can use a small twig/straw to test if hole is empty or partly filled. It does not go in to the bottom (usually six" depth), the something has likely filled part of the hole. When the female looks for a hole to lay her eggs, she chooses holes slightly larger than her body-usually 5/16" but, holes 1/4 to 3/8 inches in diameter can be included for bees that are smaller or larger than average. Bees prefer darker colors such as black, dark blue as their nesting holes. For this reason, the face of the nesting block should not be a light color such as white or yellow. You can also paint the tips of the paper tubes black (paper paint works well). No matter what kind of nests you buy, design and build, bees will use most nests. They will prefer some over others. If there are lots of bees but few nesting holes, the female Mason Bee have been known to use any type of nesting hole cavity into which she can fit. Since she will use almost any hole, what should you look for when putting your holes out for rent? The ease of getting into that hole so you can harvest and clean the hole becomes an importance priority, because in part it determines the success of your breeding healthy Mason Bees. This collection of holes is the house. The house's most important purpose is to protect these holes. If you have been rearing Mason Bees for more than two years and you think some bees are leaving your yard you might be right. Some of the bees will be looking for other rearing "Holes" nearby. This is a natural means of dispersal and not an indication of a poor site.

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