# January 2009

## Winter Care of *Osmia* Cocoons

Store cocoons at 36-39°F ( -4°C) and 60-80% RH. A refrigerator is good, or leave them in a cold place outdoors where they will not be in standing water or snow, and where rodents, birds, spiders, ants and other predators can't get at them.

Stir cocoons weekly to check for mold. If mold develops, rinse affected cocoons in 0.05% bleach (~1 tbsp 5% hypochlorite in 4 qt of water), then dry.

If cocoons seem too dry, moisten slightly or add a damp paper towel. To dampen cocoons, moisten your fingers with cold water and stir cocoons gently with your fingers, until cocoons darken from dampness. Do this once a week to once a month, depending on humidity. If mold develops, you may be moistening the cocoons too much. Allow cocoons to dry longer.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | 1 New Year's Day | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 M. L. King Jr. Day | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

More information: http://www.pollinatorparadise.com/Solitary_Bees/SOLITARY.HTM

# February 2009

## Providing nest shelters

This is a good time to consider where to put your bee nests. Hang your Binderboard® on the branch of a dead tree, a wood fence post or under the eaves of a building, using the rope attached to the roof. Stabilize the board so it does not blow in the wind. A metal hook can be used with the rope, or the rope can be removed and the hook used to hang the board from the hole in the back of the roof, as shown (left).

For large numbers of bees a hutch with a roof and back will protect nests from the elements (right). Be sure that the hutch is secured to the ground so that it remains stable even in high winds. Scatter shelters through the orchard for uniform pollination.

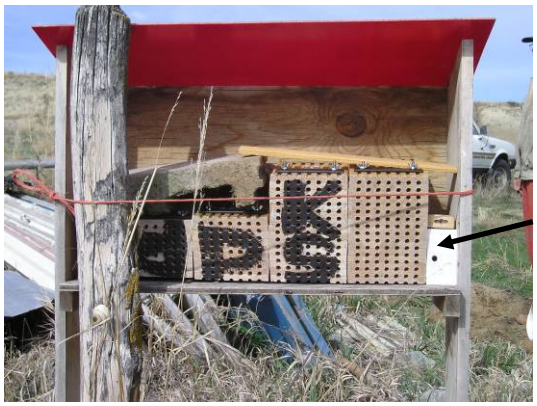
Be sure there is a constant source of mud and plenty of flowers close to the nests. Orient nests so entrances are facing east or south, and so the entrances are tilted slightly downward.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 Lincoln's Birthday | 13 | 14 St. Valentines Day |
| 15 | 16 President's Day | 17 | 18 | 19 | 20 | 21 |
| 22 Washington's Birthday | 23 | 24 | 25 Ash Wednesday | 26 | 27 | 28 |
| | | | | | | |

More information: http://www.pollinatorparadise.com/Solitary_Bees/SOLITARY.HTM

# March 2009

## Releasing bees in the spring



When outside temperatures warm, or one week before fruit bloom, empty cocoons into our cardboard or wood emergence box. For cardboard emergence boxes, rotate lid to expose emergence hole, and tape the box closed. Tape cardboard emergence box to the bottom of a bee board with the emergence hole exposed. Or place the box close to the bee board in a shelter or other protected place. Wood emergence boxes can be attached to our large or extra large metal roof or they can be placed next to the bee nesting board in a shelter, as pictured.

For natural bee emergence, move bees to their emergence site before temperatures begin to warm, usually March to April. When temperatures warm, watch for bees emerging. Males emerge first. The female bees may be slow to emerge, especially if nights are cold. Be patient.

If you want bees to pollinate fruit trees such as apples, which bloom after temperatures warm, keep bees in a refrigerator until about a week before your fruit trees bloom. Often an earlier blooming fruit tree or shrub can be used as an indicator that the late fruit will bloom in about a week. For example, plum or peach bloom may indicate that cherry or apple will bloom soon.

Be sure temperatures are close to 35°F when holding bees for late emergence. At 40°F, males may start to emerge in your refrigerator after holding them for three or four weeks. Do not try to hold cocoons for more than about 4 weeks, or their mortality will increase.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 St. Patricks Day | 18 | 19 | 20 Vernal Equinox | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

More information: http://www.pollinatorparadise.com/Solitary_Bees/SOLITARY.HTM

# April 2009

## Management during bloom

Once bees have started to nest, do not try to move the nests to a new location. Bees become easily disoriented if you move their nest after they start foraging.

If a hard freeze is expected during bloom you may want to move their nests temporarily into a refrigerator overnight, or cover the nest with a blanket or other insulation to keep the nests from freezing. Wait until after dark to move or cover the nest, and be sure to remove the insulation or return the nest to the exact same location the next morning. If you move a nest, carry it with entrance holes facing up so feeding larvae stay on their pollen resources.

Most of all enjoy watching the bees as they come and go from the nest with pollen or mud. Seeing them on the flowers is more difficult. The best time to look for orchard bees on flowers is shortly before dusk, when they all come out for a drink of nectar before dark.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 5 Palm Sunday | 6 | 7 | 8 | 9 Passover | 10 Good Friday | 11 |
| 12 Easter Sunday | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 Earth Day | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | |

More information: http://www.pollinatorparadise.com/Solitary_Bees/SOLITARY.HTM

# May 2009

## Alternative Bloom and Feeding with Sugar Water

Do your bees have an alternate source of bloom to visit after fruit bloom ends? If not, they may not reproduce to their full potential. Allow weeds like dandelion to bloom, or plant alternative flower sources that bloom before and after fruit bloom. A succession of different varieties of fruit trees and ornamental flowering trees is great. Herbaceous plants like *Phacelia tanacetifolia* (lacy phacelia, scorpion weed, fiddleneck) are also good. Be sure there is plenty for the bees to forage from so they can continue to provision their cells. Otherwise they will look for nests elsewhere, or they may starve, and will not reproduce.

One bee enthusiast reports success using a feeder that consists of an upside down mason jar filled with sugar water and set on a plate where the sugar water pools from small slots cut in the plastic screw-on lid. Cover the plate and nectar with a doughnut shaped plastic or stainless steel screen (1/8 inch mesh). The mesh should fit snugly to keep bees from finding their way into and drowning in the sugar solution. Position the feeder directly in front of the nests in an ant-proof location. Condition the bees to feed by scattering fresh flower petals on the screen each morning. Spray the petals with sugar solution. (More details are available at: http://www.pollinatorparadise.com/Solitary_Bees/feeding_mason_bees.htm)

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 Mother's Day | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24<br><br>31 | 25 Memorial Day | 26 | 27 | 28 | 29 | 30 |

More information: http://www.pollinatorparadise.com/Solitary_Bees/SOLITARY.HTM

# June 2009

## Summer storage

After fruit bloom when the bees have finished foraging, remove nests from the orchard to a protected place such as a garage, porch, barn etc. When moving nests after bloom, carry the nests with entrance holes facing up so feeding larvae stay on their pollen resources.

Nests can also be left outdoors, but be sure that they do not experience excessive hot temperatures, and that they are protected from rain, standing water, and rodents.

Cover the nests with fine netting to prevent tiny chalcid wasp parasites from entering the nests and killing the dormant larvae. Netting also prevents summer species of solitary bees and wasps from using empty nests. Chalcid parasites tend to become active in the summer about the end of fruit bloom, so covering the nests can help reduce their populations.

Check the net covering periodically during the summer and kill adult chalcids that are crawling around the bag so they don't re-infest the nest. Keep contaminated nests separate from uncontaminated nests.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 Flag Day | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 Father's Day Summer Solstice | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | | | | |

More information: http://www.pollinatorparadise.com/Solitary_Bees/SOLITARY.HTM

# July 2009

## Trap-nesting local bee populations

There may be native populations of spring flying orchard bees in your area, as well as summer flying mason bees and leafcutter bees (*Megachile*, *Hoplitis*, *Anthidium*, *Heriades*, and other genera). Many of them nest in tunnels in wood like *Osmia*, so their populations could be managed, although they are not available commercially. You may be able to increase their populations by setting up artificial nests in appropriate habitat. Look for places that would naturally attract these bees: habitat with lots of blooming flowers, and dead wood such as fence posts, wood buildings, wood piles, dead logs, etc.

Most twig-nesting bees will nest in tunnels that are 3/16 to 1/4 inches in diameter, but a few species nest in 5/16 inch tunnel diameters, including both *O. lignaria* and *O. cornifrons*.

There are about 4,000 species of bees in North America. Most of them dig tunnels in the ground, and can't be managed. However they can be conserved by having lots of flowering plants around, not using insecticides, and keeping some land untilled.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 Independence Day |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

More information: http://www.pollinatorparadise.com/Solitary_Bees/SOLITARY.HTM

# August 2009

## Squash Bees

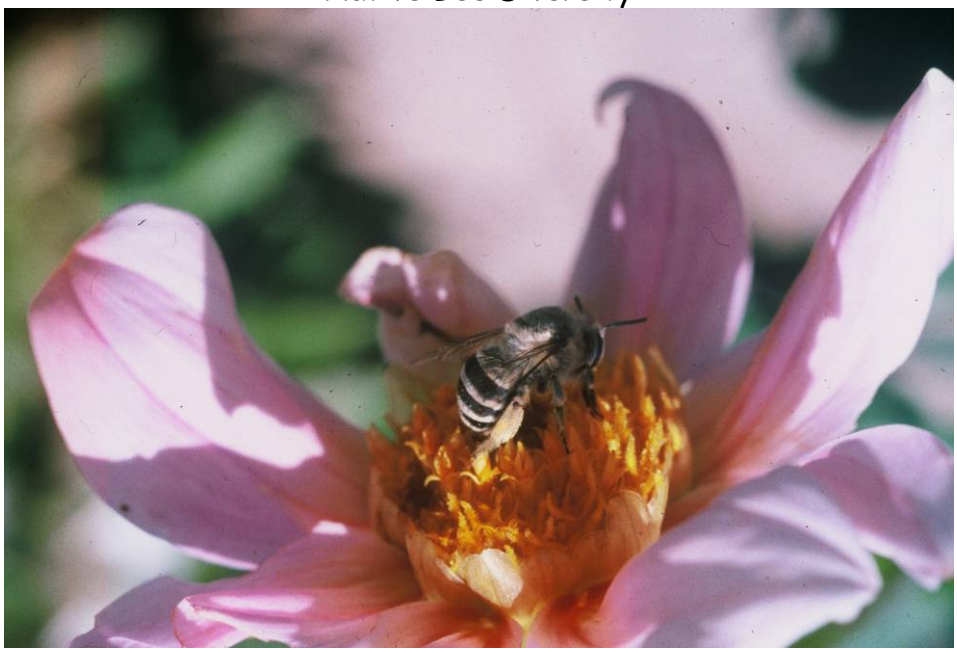
Squash bees in the genus *Peponapis* and *Xenoglossa* are native to North America and are specialized foragers of squash flowers. Watch for them in your garden. They fly early in the morning when squash flowers bloom. Males patrol the squash patch, stopping for nectar and to look for females. They seem to be more abundant and are easier to spot than the foraging females, who collect pollen and are more focused in their foraging behavior. They make their nests in the ground.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 Ramadan begins |
| 23<br>30 | 24<br>31 | 25 | 26 | 27 | 28 | 29 |

More information: http://www.pollinatorparadise.com/Solitary_Bees/SOLITARY.HTM

# September 2009

## Native Bee Diversity



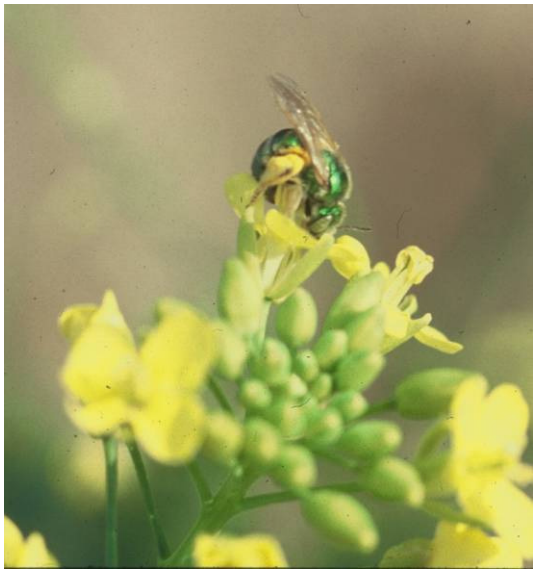
Watch for ground nesting digger bees like this one foraging on Cosmos.
Note the pollen basket on the hind leg.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 Labor Day | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 Rosh Hashanah |
| 20 | 21 | 22 | 23 Autumnal Equinox | 24 | 25 | 26 |
| 27 | 28 Yom Kippur | 29 | 30 | | | |

More information: http://www.pollinatorparadise.com/Solitary_Bees/SOLITARY.HTM

# October 2009

## Native Bee Diversity



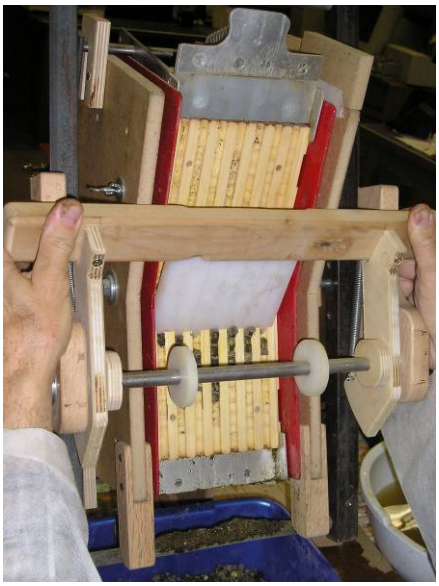
Ground nesting sweat bee, left, and sunflower bees (right).

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 Columbus Day | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 Halloween |

More information: http://www.pollinatorparadise.com/Solitary_Bees/SOLITARY.HTM

# November 2009

## Removing loose cocoons



Whether you clean your Binderboard® with a hand-held scraper (left) or with our prototype machine (right), November - January is the time to clean cocoons out of your Binderboard®.

Collect cocoons, mud and other debris in a plastic tub. Transfer cocoons and debris to a mesh strainer or a mesh basket. Rinse in cold water to remove the mud. Rinse in 0.05% bleach (~1 tbsp 5% hypochlorite in 4 qt of water) to loosen mites, then rinse in cold water to remove the mites and to rinse off the bleach. Remove any remaining debris and cocoons that are soft, have parasite holes, or otherwise are questionable. Allow cocoons to dry in a single layer out of direct sun, and then place in an appropriate container in cold storage.

Clean Binderboard® pages by painting them with a brush dipped in bleach water. Allow to dry for a few hours and then replace the bolts and roof so laminates don't warp.

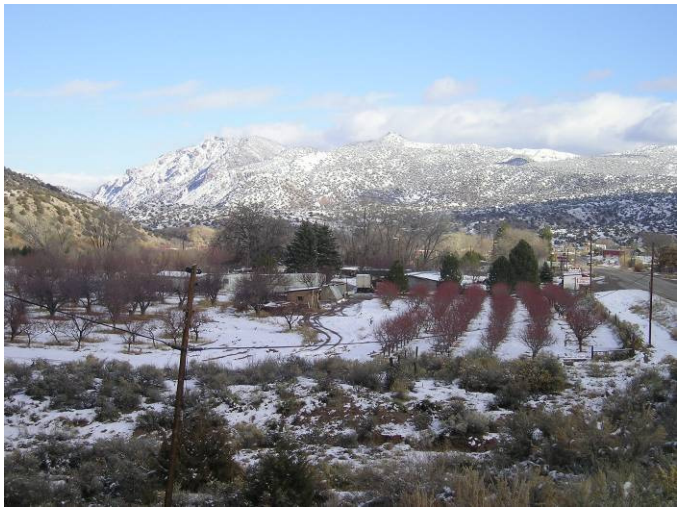
| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11<br>Veteran's Day | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26<br>Thanksgiving | 27 | 28 |
| 29 | 30 | | | | | |

More information: http://www.pollinatorparadise.com/Solitary_Bees/SOLITARY.HTM

# December 2009

## Cocoon storage

Photo: Anna Sopyn's orchard, Rinconada, New Mexico



Orchard bees must experience cold temperatures during the winter for several months in order to emerge successfully in the spring. Ideal temperatures are between 36 and 39°F, 2 - 4°C and about 60% relative humidity. An unheated shed, garage, or barn in a cold climate will usually work. So will the vegetable drawer in a refrigerator. In dry climates, or in the refrigerator, keep cocoons in a plastic container or bag with air holes to help maintain humidity.

Store cocoons where they will not be in standing water or snow, and where rodents, birds, spiders, ants and other predators can't get at them.

If storing cocoons out of doors, move them temporarily into a refrigerator if the temperatures exceed 45°F (7°C) for more than 3 or 4 days or if temperatures are expected to fall below 10°F (-12°C) in the storage area. By mid February to late March if temperatures warm, the cocoons may need to be moved to a refrigerator until shortly before bloom.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 Hanukah |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 Winter Solstice | 22 | 23 | 24 | 25 Christmas | 26 |
| 27 | 28 | 29 | 30 | | | |

More information: http://www.pollinatorparadise.com/Solitary_Bees/SOLITARY.HTM