



Pollination of Greenhouse Tomatoes

Outdoors, field grown tomatoes rely on the wind for pollination but there is not enough wind movement in high density plantings of greenhouse tomatoes. In the greenhouse, growers can use bumblebee hives or manual pollination with an electric pollinator. Proper pollination is needed for greenhouse tomatoes to flower and set fruit. Pollen from the anther needs to reach the ovaries at the base of the flower. With insufficient pollination, there is poor and uneven fruit set, with misshapen fruit.

Greenhouse tomatoes should be grown at temperatures between 65 ° F and 85° F once flowering begins. Tomatoes need nighttime temperatures of 55 to 70° F to produce pollen, and daytime temperatures should not be above 85° F. Heat and vent the greenhouse to maintain relative humidity levels between 50 and 80% so the pollen isn't either too dry or too sticky.

Mechanical pollination

Shaking or vibrating of each flower cluster needs to be done every other day. It's best done in the middle of a sunny day with low relative humidity (about 70%). You vibrate the flowers by touching the stem of the tomato flower for a few seconds. Don't touch the flower so you do not create a hole in the developing fruit. An electrical vibrator with rechargeable batteries can be purchased from greenhouse supply companies. Battery operated toothbrushes are another option. This technique is best used for smaller greenhouses due to the labor involved.

Bumblebees (*Bombus sp.*)

To ensure high quality fruit and higher yields, many larger growers introduce bumblebee hives. This can be a tremendous labor savings over mechanical pollination.

Bumblebees are "buzz pollinators" that grab unto the tomato flower and move their flight muscles rapidly, so that the flowers and anthers vibrate, dislodging the pollen. They are active during cloudy conditions and are excellent pollinators.



Figure 1: Bumblebee visiting tomato flower. Photo by L. Pundt

Bumblebees are shipped in maintenance-free hives with a food source and are introduced once the first tomato cluster is open. They need pollen as a protein source for the build-up of the colony. However, tomatoes do not produce any nectar, so the bumblebees need to be provided with a sugar solution which is included with the hive. Hives generally last 6 to 12 weeks depending upon the type of hive. Place the hive within or below the plant canopy so there is enough shade so the bumblebees are cool and protected.



Figure 2: Bumblebee hive in a greenhouse. Photo by L. Pundt

Consult with your biological control supplier on the number and size of hives to introduce and to develop a pollination plan to insure a balance between the tomato flowers and number of bumblebees.

Check tomato flowers for a brown discoloration or marking on the cone of the tomato flower to see that the bumblebees have visited the flowers. Too many marks indicate that the bumblebees are visiting the flowers too often and flowers can abort. Pollen available from biological control suppliers can be used to help in this situation.

Bumblebees are best used in conjunction with an established biological control program due to the adverse direct and indirect effects of insecticides on the bees. Contact your biological control supplier for the latest information about the persistence and compatibility of specific insecticides before using any insecticide. If necessary, the bumblebee hive can be removed from the greenhouse.

Before introducing bumblebees, remove blue sticky cards (used for thrips monitoring) because they may attract the bumblebees. Avoid placing ornamental hanging baskets (treated with systemic insecticides) in the same houses with greenhouse tomatoes.

For more information:

Biobest <http://www.biobestgroup.com/>

Bioline Agrosiences <http://www.biolineagrosiences.com/>

Koppert Biological Systems <https://www.koppert.com/>

By Leanne Pundt, UConn Extension, 2017.

References

OMFRA Staff. 2010. Growing Greenhouse Vegetables in Ontario. Publication No. 836. 160 pp.

Phillips. B. 2016. Pollination of Greenhouse Vegetables a Challenging Endeavor. Vegetable Grower News. Feb 18, 2016. 6 pp.

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