

# Use of Temperature and Moisture Extremes To Manage Western Flower Thrips In Greenhouses

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As most greenhouse growers have experienced this spring, controlling Western Flower Thrips (WFT) using only pesticides can be an uphill battle. A question that often arises in this regard is the effectiveness of thrips management by freezing or heating when greenhouses are shut down during the off-season. This article is a summary of recent research in this area.

## High Temperature

**Question:** Can WFT be killed by shutting down a greenhouse during the summer?

An average temperature of 104 degrees and a relative humidity of 10% killed 100% of WFT after four days. This experiment was conducted using thrips caged on live plant material that was not watered, so plants were dead by the end of the second day. Highest mortality at temperatures lower than this was only about 50%.

Mortality was only 50% if live plant material (and, thus, a source of water) was present. Remember that plant material includes weeds, so weed control must be included in this scheme.

**Answer:** Based on these results, thrips management by heat does seem to be feasible if it is done in conjunction with weed control. Reference: *Environmental Entomology*. 1993. 22(4):726-732.

## Cold Temperature

**Question:** Can WFT be killed by shutting down a greenhouse during the winter?

**Question:** Can WFT overwinter outside the Northeast?

Time required to kill 99% of WFT at two different temperatures:

Air temp.	Thrips stage	Time
23 degrees F	Adult	6 days, 14 hours
	Pupal	
	2nd instar	
14 degrees F	Adult	3d, 4h3d, 4h
	Pupal	
	2nd instar	

This strain of WFT originated in California and, in a separate study, was found to be unable to survive a winter in Denmark with a minimum air temperature of 15.6 degrees F.

There is a strain of WFT that overwinters in British Columbia. It is no more cold hardy than the California strain in the lab, but may overwinter deeper in the soil, enabling it to survive in British Columbia.

WFT were found to overwinter in central Pennsylvania in an area where average winter minimum air temperature is 0 to -10 degrees F. During the time of this study, the lowest air temperature recorded was 2 degrees F, and the daily minimum air temperature fell below freezing for a period of 35 consecutive days.

**Answer:** Based on these results, it seems unlikely that freezing during the winter will kill WFT in a greenhouse with soil floors.

Overwintering in an empty greenhouse occurs in the soil, where ambient temperatures may not be as low as those reported in this study. This technique is more likely to succeed in a greenhouse with concrete or clean gravel floors. It also seems likely that WFT can overwinter outside the Northeast. One way to test this is to place emergence strips outside the greenhouse in late April to late May. This consists of an inverted plastic shoebox placed on the soil with a blue sticky card clipped to the inside. It is also possible to coat the inside with a sticky spray. Be sure to cover the edges of the box with soil so any thrips coming from the greenhouse cannot enter. If thrips are emerging from the soil, they will be caught in these traps. References: *Canadian Entomologist*. 1993. 125:971-3 and *Environmental Entomology*. 1993. 22(3):647-653.

## Drowning

**Question:** Can WFT survive in ebb and flow irrigation systems?

Time required to kill 99% of WFT fully submerged in water with fertilizer (pH 5.5-6; conductivity 1.5-2.0). They are able to survive by making air bubbles around themselves.

Thrips stage	Time
Adult	4 days, 7 hours
Pupal	13d, 4h
2nd instar	13d, 9h

**Answer:** This suggests that WFT can survive in ebb and flow systems. Reference: *Environmental Entomology*. 1993. 22(3):647-653.

## Results

The results of these studies indicate that it is possible to use manipulation of the greenhouse environment as part of a thrips management program in some situations. This should be coupled with rotation of less preferred crops such as poinsettias into houses with the highest thrips populations.

The use of heating in midsummer will be in vain if good thrips management is not practiced in adjacent greenhouses and greenhouse exteriors. As soon as the closed house is opened, new thrips will move in to replace those that were killed. Good exterior thrips management, thorough sanitation and weed control will keep this to a minimum.

Use of environmental manipulation is only part of comprehensive thrips management program. Year-round monitoring of thrips using sticky traps and plant inspections to keep tract of WFT populations is essential.

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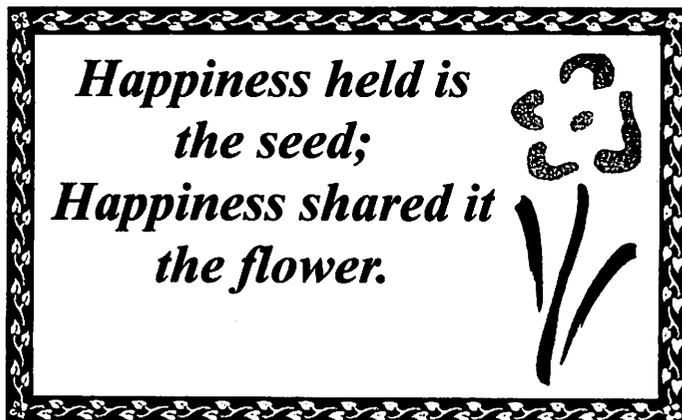
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## New Faces at McCorkle Nurseries

McCorkle Nurseries is pleased to announce two staff additions. Brian Jernigan and Kenny Jenkins join Mark Johnson's Horticulture Staff with particular responsibilities for development of perennial and color crops and pest management.

According to Johnson, "Brian and Kenny are important additions to our staff of professional growers. Brian came to our staff just five days out of Auburn. He brings his training in perennials to the development of our color crops. Kenny came to us from The University of Georgia and accepted the responsibility of bringing the new Center for Applied Nursery Research to readiness for its grand opening. With the CANR successfully open, Kenny now moves on to applying his training to the McCorkle's Integrated Pest Management Program."

McCorkle Nurseries produces more than 4 million plants annually from its growing operation, headquartered near Dearing, 30 miles west of Augusta, Georgia. McCorkle Nurseries is committed to continual growth in producing and marketing quality plants while protecting and improving the environment.



## Congratulations!

### Not Just Another Anniversary

Another company is having an anniversary. And you say "Oh yeah." "Big whop." "Boring." OK, maybe it's not as exciting as having your team win the superbowl, but it did give us somewhere to go every week for 125 years.

Actually we are celebrating more than our 125 years of customer satisfaction, we're celebrating an industry . . . the horticultural and floriculture industry.

Stuppy Floral Company was founded in St. Joseph, MO, in 1873 by L. J. Stuppy. The business started as a hobby and diversion to L. J.'s principal occupation as a court reporter. He grew plants and flowers in his own greenhouses and sold them on a retail basis. As the growing operations were expanded and more greenhouses added, surplus product was sold to other retailers, and the wholesale business was established. Wholesaling of fresh flowers soon became the principal business with shipments being made as far away as Texas and Oklahoma. L. J.'s two sons, F. X. and John joined the business (which was incorporated in 1903) and L. J. died in 1908 leaving the business to F. X., John, and their four sisters.

John, who was primarily in charge of growing, died during the flu epidemic of 1918. F. X., who was President and General Manager, died unexpectedly in 1922. Before he passed away, F. X. established Stuppy Supply Company in Kansas City, Missouri. The primary purpose of this company was to sell in the Kansas City market and emphasize florist supplies (hardgoods).

When F. X. died, a brother-in-law, B. W. Murphy, assumed management control as President. He continued in that capacity until 1937 when George Stuppy, son of F. X., became President. The Company has continued to grow and expand. A wholesale branch was operated in Dallas, TX for a short time in the 1940's and another (still in existence) was opened in 1957 in Topeka, KS.

Frank X. Stuppy, who joined his older brother George, led the Company into a new field: Greenhouse supplies. Tremendous growth in the area led to the manufacturing of Stuppy Rainbow and Rainbow plus greenhouse structures. The Greenhouse Division now produces about half of the Company's total business.

The two separate corporations were merged in 1972 by James C. Stuppy (George's son). The surviving corporation, Stuppy Floral, Inc., later simplified its name to Stuppy, Inc. Jim was named President and Chief Executive Officer in July 1975. George retired in June of 1985 and died in 1997. Frank died in 1991. Both of these third generation Stuppy's were active for over 50 active years in the business.

In 1978, the last of the Company's greenhouse growing ranges, which produced flowers and plants were closed.

In 1980, a wholesale branch was opened in Wichita, KS; in 1982, another branch was purchased in Memphis, TN (Stuppy Southern, Inc., sold in 1989); and 1984, TriState Wholesale Florist, Inc. in Quincy, IL was purchased leaving the total number of branches currently operating at five. In 1983, the Mid-America School of Floral Design was started to help educate retailers.

Through the years, we've seen stricter building codes, tighter profit margins, increased off-shore competition, and a whirlwind of technology. Far from boring, the industry has evolved at lightning-like speeds. While we're not asking for a moment of silence at your next football game, we are asking you to join us in our celebration as we thank you for helping make our first 125 years of 'BUILDING SOLUTIONS'. And about how to celebrate it? A small "Wave" at your leisure would be nice.