

TECH TIP: BACTERIAL PREVENTION

Question: Bacterial leaf spot on our Flowering Cabbage and Kales was a serious problem last season. What can we do to eliminate (or greatly reduce) the footprint of Xanthomonas in our facility. What are some best practices to control this disease?

Answer: The first step is to start with seed that was tested negative for bacterial leaf spot or buy plugs from a producer who uses tested seed and sound disease management. Bacterial infection and spread can occur over a wide range of temperatures – the same temperatures that are optimum for plant growth. To manage bacterial disease, you should have an environmental AND chemical control program. Copper sprays are a good strategy. Remember that dry foliage is the best control strategy. If the foliage is wet due to rain or overhead irrigation, you can easily and rapidly spread the bacteria. Excess overhead irrigation (and rain) also washes off the copper sprays that are on the foliage as a protectant against bacteria spread in the water film. The key to managing bacterial infections is: Dry foliage + Copper sprays. (Keep in mind that although copper resistant bacteria do exist, we normally don't see this as a problem in greenhouse production.)

Week After Plant	Chemical	Growth Phase
1	Camelot O	Early Growth
2	Phyton	
3		
4	Camelot O	Rapid Leaf Unfolding
5	Phyton	
6	Camelot O	
7		
8	Camelot O	
9	Phyton	
10	Camelot O	
11		Leaf Coloring
12	Camelot O	
13	Phyton	
14	Camelot O	

Copper Choices

Remember that Phyton works a bit differently than other copper fungicides, such as Koicide, Camelot O, Champion, Junction, etc., which work on the leaf. Phyton is locally systemic (only in the leaves that are treated). An application of Phyton when leaves are unfolded will get copper *into the leaf* while regular Camelot O application places copper *on the leaf*.

So how often should you spray? If you are keeping foliage dry then you can apply Camelot O every two to three weeks, as the foliage unfolds. After about the third overhead irrigation (or rain event) the copper *on the leaf* is reduced to a level where the leaf surface is not protected. Growing with dry foliage translates to less frequent sprays since you are not washing the copper off the foliage. By having Phyton *in the leaf*, you then can have control *inside and outside* to give you maximum protection. Start early so the lower leaves are treated with Copper before they become covered by the bigger leaves. Consider alternating with Phyton on a three-week basis to make sure that leaves are treated.

See rotation chart (left) for example.

You can see that there is a rapid growth phase where the leaves are unfolding rapidly, and more frequent copper application is needed. As the plants start to color, the spray program can be stretched out since the leaf unfolding is slower.

As a side note, there is research that shows adding Mancozeb (Dithane) to the Camelot O increases the control of bacteria. Consider tank mixing the copper with mancozeb.