

THE PREMIX Dilemma

While tank mixing is a common practice, it certainly has its challenges. Today, many premixes are available — which option will be most useful for you and your operation?

BY A.R. CHASE

Since I started working at the University of Florida in 1979, tank mixing has been a fact of life. I have a natural aversion to it because of being exposed to growers who mixed insecticides, miticides, fertilizer, minor elements, fungicides and bactericides (and adjuvants) all together to save labor costs. They sometimes got control, but other times had poor control or even phytotoxicity. Trying to figure out what went wrong when six or more products have been tank mixed is a nightmare, to say the least. The advent of premixes may have been partially fueled by the movement away from toxic, long-lived, broad-spectrum fungicides. We had to try to achieve the same level of broad-spectrum control so a premix was one way to achieve that.

HISTORY OF PREMIXES

Premixes are described as products with two distinct active ingredients. The history of premixes in the ornamental industry is long. One of the oldest ones I know of is Banrot, which includes etridiazole for *Pythium* and *Phytophthora* and thiophanate methyl for *Rhizoctonia*, *Fusarium*, and *Thielaviopsis*. Another broad-spectrum product that we have is Spectro 90 (Nufarm), which consists of chlorothalonil and thiophanate methyl. This premix can aid in resistance management since the two active ingredients are at times each effective on the same soil-borne fungus (*Rhizoctonia* and *Fusarium*). One of those that is no longer available is Hurricane (Syngenta), which included mefenoxam and fludioxonil, another broad-spectrum product for root and stem rot caused by fungi. Premixes can also be directed at foliar diseases. The mixture of mancozeb and copper (Junction from SePRO) covers both fungal and bacterial diseases of leaves and has been available for many years.

In the current timeframe, we have been inundated with premixes that include a FRAC 7 (SDHI) and a FRAC 11 (strobilurin) active ingredient. These 7/11 premixes are Pageant

Intrinsic, Orkestra Intrinsic (BASF), Mural (Syngenta) and most recently Broadform (Bayer). These are broad spectrum and potentially help in resistance management on many fungi.

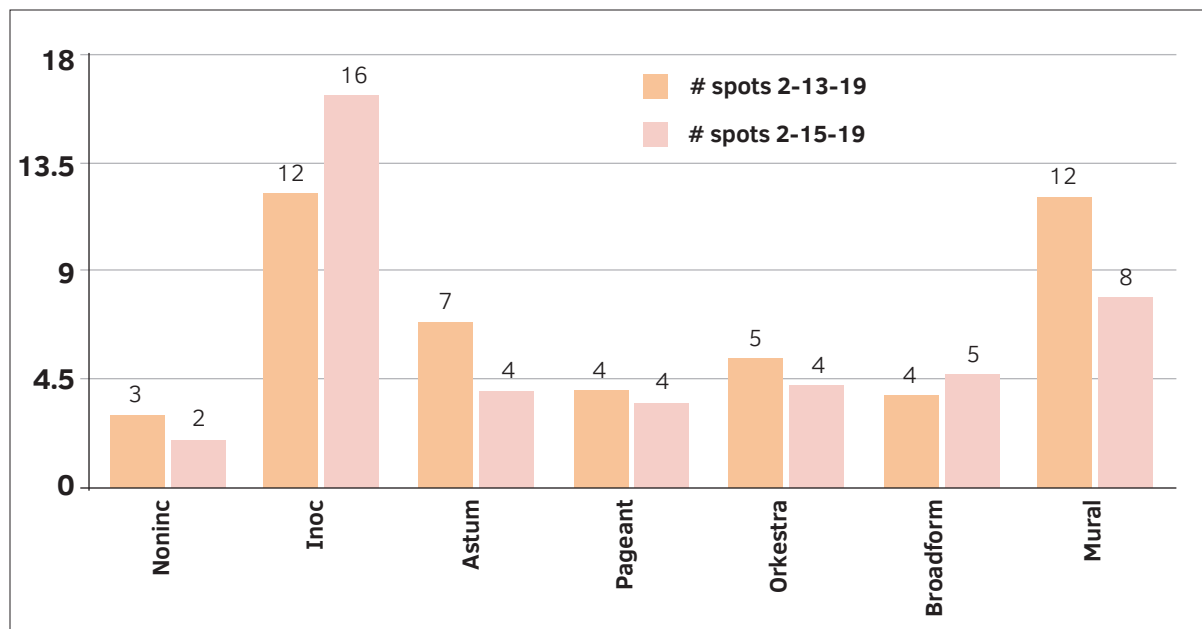


Figure 1. Effect of FRAC 7/11 products on severity of Sclerotinia petal blight on cyclamen.

POSITIVE ASPECTS OF PREMIXES	NEGATIVE ASPECTS OF PREMIXES
Improved control	Specific active ingredients may not be ideal
Diagnosis is less critical	Specific ratio of active ingredients may not be ideal
Mixed infections are covered	May be more costly
Plant safety is known	False sense of security
Resistance management	REI based on the longest time
Can be more cost effective	
Fewer products on your shelf	

Table 1. Advantages and disadvantages of using a premix fungicide/bactericide.



Figure 2. Symptoms of Sclerotinia blight on cyclamen flowers.

FUNGICIDE	COMPONENTS (FRAC)	FEATURE
Broadform	trifloxystrobin (11)/fluopyram (7)	Broader spectrum/Resistance
Concert II	chlorothalonil (M5)/propiconazole (3)	Broader spectrum/Resistance
Junction	mancozeb (M3)/cupric hydroxide (M1)	Broader spectrum/Resistance
Mural	azoxystrobin (11)/solatenol (7)	Broader spectrum/Resistance
Orkestra Intrinsic	pyraclostrobin (11)/fluxapyroxad (7)	Broader spectrum/Resistance
Orvego	dimethomorph (40)/ametoctradin (45)	Resistance
Pageant Intrinsic	pyraclostrobin (11)/boscalid (7)	Broader spectrum/Resistance
Palladium	fludioxonil (12)/cyprodinil (4)	Broader spectrum/Resistance
Spectro 90	chlorothalonil (M5)/thiophanate methyl (1)	Broader spectrum/Resistance

Table 2. Some currently available premixes for ornamentals.

WHY DO WE HAVE THE PREMIXES THAT WE HAVE?

It is certainly not because the companies create a product for the ornamental industry. We are insignificant in the global pesticides market, and what we get is essentially a current product in a large crop like vines (grape), fruit (apple), rice or grain. Further, the only time we will get a new “bactericide” is usually because a product works on fungi first and just happens to work on bacteria as well. This was true even for the copper products that are mainstays for bacterial control.

Use of premixes or tank mixing into a single application will continue to be common in ornamental production. The savings in labor costs, simplification of REI requirements and especially the ability to cover your entire operation in a timely manner will drive choices frequently. For disease prevention and control, the choice of using premixes vs. creating your own through tank mixing is a critical decision. Choosing a fungicide premix to cover your bases has always been desirable as evidenced by early premix products, like Banrot, which combined thiophanate methyl and etridiazole for control of most soil-borne fungi that caused root and crown rot.

The decision to use a premix fungicide/ bactericide can be based on resistance management, ease of use, cost effectiveness and breadth of activity. Knowing that the two ingredients in a premix are chemically suited to work together and, in some cases, both are effective on the target disease is critical for some producers. In some cases, mixing two fungicides ends up with excessive amounts of adjuvants, making them phytotoxic. When the manufacturer creates the premix, you can be sure they have considered this possibility.

Table 1 lists some of the advantages and disadvantages of using premixes.

CHOOSING THE RIGHT PREMIX

One of the most important aspects of premixes is that if the correct partners are chosen, they are excellent for resistance management. The only requirement is that both active ingredients target the pathogen. For instance, both copper and mancozeb in the premix Junction work on bacteria like *Pseudomonas* and *Xanthomonas*.

Table 2 lists some of the premixes currently available. The newest premixes (FRAC 7/11) can work to broaden the target list by being additive and controlling a wider range of pathogens. They also can work in resistance management since many of the listed on their labels can be controlled by both active ingredients. One thing to remember, however, is that you cannot rotate between the two products since each

one contains an active ingredient in FRAC 7 and one in FRAC 11. Thus, rotating between them would NOT be an effective practice for resistance management.

Mike Zemke and I are back to doing trials after almost five years away from it. Last year, we did about 40 trials and have increased our test space again for 2020. We conducted one trial on cyclamen with Sclerotinia petal blight early in 2019. Treatments were: noninoculated and inoculated controls, Astun (a FRAC 7 fungicide) at 17 ounces/100 gallons, Pageant Intrinsic (18 ounces), Orkestra Intrinsic (8 ounces), Broadform (6 ounces) and Mural (7 ounces). Products were applied once before inoculation and twice afterward on a weekly

interval. Results in Figure 1 show that Astun, Pageant Intrinsic, Orkestra Intrinsic and Broadform provided very good control, while Mural was less effective.

There are a number of diseases that react similarly to each of the 7/11 premixes. I will call these their core competency on foliar diseases — Alternaria, Cercospora, Colletotrichum (anthracnose), Cylindrocladium, powdery mildew, rust and Sclerotinia. The reaction is typically very good to excellent control when used according to their labels. In a few cases, one of them works better than the others. These are shown in Table 3. There are a few blank spaces in the table because I was not able to find tests on this specific disease.

For the diseases in Table 3, choosing one over another could be meaningful. For instance, Broadform is not labeled for downy mildew. Black spot on rose control appears best with Broadform or Mural. Watch for a new premix from Syngenta midyear; it will be a premix of FRAC 3 and 7 and a welcome addition to our tool box.

HOW DO YOU ROTATE WHEN USING PREMIXES?

Despite the fact that each of the premixes has two active ingredients representing two different FRAC groups, it is still a good idea to rotate products. If you pick another premix, you would be using four different FRAC groups, which should be ideal for resistance management without adding

confusion to your job. Although few of you seem concerned with following labels correctly, rotating may be the only legal way to make sure a crop does not have more than a legally mandated maximum amount of a particular product per season or year. Some of the products do have maximum application restrictions (including Broadform, Orkestra Intrinsic and Pageant Intrinsic).

If you are rotating for miscellaneous leaf spots and Botrytis, you could rotate Broadform (7/11) and Palladium (9/12). If, however, you are in an outdoor nursery and have both bacterial and fungal leaf spot concerns, you could rotate Orkestra Intrinsic (7/11) with Junction (M1/M3). If you are in an outdoor nursery without any bacterial concerns, you can rotate Concert II (3/M5) with Orkestra Intrinsic (7/11). If you are growing roses outdoors, you need to be concerned with black spot, rust, downy mildew and powdery mildew, often all at once. Consider Mural and something else altogether.

If what you really want is the best product for a specific combination of diseases on a specific crop, you may not be able to find a premix already created. You will be making your own tank mix to do your best to manage disease losses and pesticide costs.

CONCLUSIONS

Premixes save time and allow the user to be less involved in disease management. In the case of premixes, you are making use of manufacturer expertise; in the case of tank mixing, you (or a consultant) are becoming the expert. Both are valid and effective ways to approach disease management in ornamental production. [gpn](#)

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Product	Black Spot	Botrytis	Downy Mildew	Myrothecium	Phyllosticta
Broadform	Excellent	Excellent	Not labeled		
Mural	Very good/excellent	Good/excellent	Very good	Excellent	Very good/excellent
Orkestra Intrinsic	Some/very good	Some/excellent	Very good/excellent	Very good	
Pageant Intrinsic	Good/very good	None/excellent	Very good/excellent	Some/excellent	Excellent

Table 3. Efficacy for 7/11 fungicides on various foliar diseases.

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