

GROWERTALKS

Features

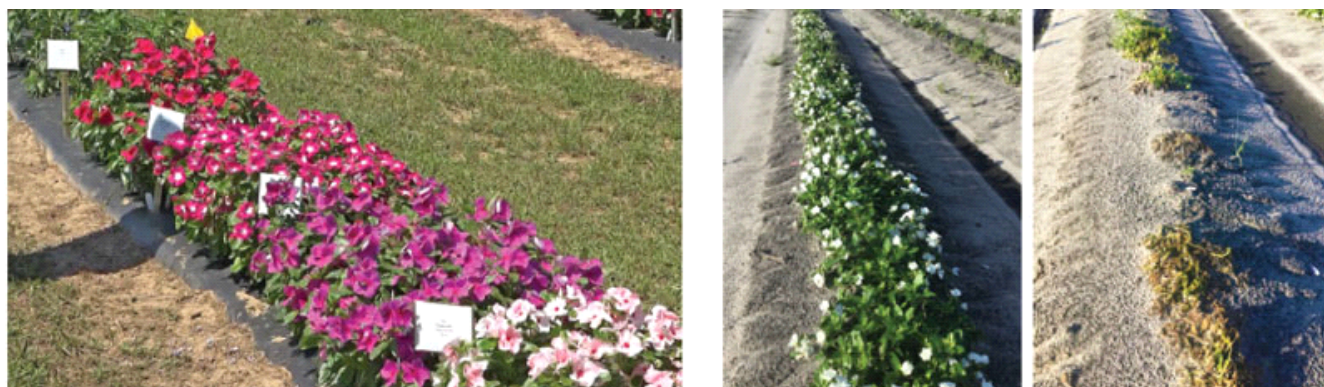
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The Best Under (Disease) Pressure

Amy Gard'ner

In today's Southern landscaping market, few bedding plants are as important as annual vinca (*Catharanthus roseus*). Hardy and well-suited to high heat and humidity, vinca has been relied upon for decades to provide lasting color in extreme climates.

Vinca is naturally very susceptible to the fungal-like pathogen *Phytophthora nicotianae*, which causes foliar blight. *Phytophthora* is soilborne, infecting plants through water splashing up from the ground during significant rains and overhead irrigation. A heavy disease load can decimate a bed of susceptible vinca in a matter of weeks or even days. Many factors—including long-term use of disease-resistant plant material and minimal use of fungicides—support pathogen mutation, creating a dynamic moving target for disease resistance breeding. Continued progress in innovative breeding is crucial to maintaining this valuable landscaping asset.



Pictured above left: Cora XDR varieties planted at the Texas A&M AgriLife Research and Extension Center, Summer 2020.

Pictured above right: Cora Cascade White vs. a competitor white at Vero Beach, Florida, January 2021.

Nirvana Cascade Pink Splash, the first disease-resistant vinca, was introduced in 2005. A full series of seed-raised vinca followed closely in 2007 when Goldsmith Seeds, now a part of Syngenta Flowers, brought to market the original F1 Cora series. The original Cora series was resistant to a limited number of isolates of *Phytophthora nicotianae*. This introduction reinvigorated the market and allowed landscapers to once again make use of vinca in harsh climates. The victory was a major advance, but over time, the disease mutated and started to overcome one of the only options landscapers had to beautify garden beds in hot, humid areas.

Syngenta endeavored to advance the series, and in 2019, the new and improved Cora XDR was introduced. XDR stands for Extreme Disease Resistance. Instead of just one isolate, Cora XDR has been proven to be resistant to

20 different isolates of Phytophthora, including 10 of the most virulent. The process for this development hinged on in-house trialing, third-party collaborations, field testing in significant environments and utilization of public field trials.

What does XDR mean?

XDR means best in class disease resistance. In order to be given the XDR designation, the variety must go through rigorous testing, both in the lab and in multiple relevant field trials. The second requirement to be deemed XDR is that the disease resistance must be validated by third-party experts.

For Cora XDR, this is accomplished through a collaboration with Professor of Plant Pathology and Extension Specialist Steve Jeffers, Ph.D. from Clemson University's Plant and Environmental Sciences Department. Dr. Jeffers specializes in pathogen detection, identifying new sources of inoculum and developing integrated disease management practices for the industry.

How do we breed for disease resistance?

The Phytophthora of the Goldsmith days isn't the Phytophthora of today, nor will it be the same five years from now. Phytophthora is persistent, mutating readily to the resistances bred into the plant. For this reason, the breeders' job is never done.

Syngenta's breeders, Dr. Shifeng Pan and Dr. Amanda Hershberger, started the with the deliberate collection of multiple isolates of Phytophthora from many sources, including universities and extension sites across the Southern U.S. to use in their screening. Dr. Jeffers and his research team at Clemson have played an integral role in the ongoing collection from various geographical locations and in conducting inoculations in both greenhouse and outdoor tub trials.

Amanda said: "When breeding in disease resistance, it is really a race against time. That is why we aim to improve each variety three to five years after it is introduced. The quick mutation is why it is so important to combine disease-resistance breeding with chemical (fungicides) applications, delaying the mutation in order to prolong the resistance. Disease resistance is just one, albeit a very important, mode of action in the arsenal against disease."

How do we trial for disease resistance?

Each Cora XDR line goes through rigorous lab and container tests, as well as multiple in-ground field tests in areas of high disease pressure.

Amanda commented on the importance of both laboratory and field testing: "It is so critical to do both lab and field testing. Lab tests allow us to apply a super-high concentration of the disease. We inoculate on what we call "a nuclear level" in order to ensure that there are no escapees. Our target is absolute annihilation of the susceptible varieties. If it is not disease resistant to the full spectrum, it won't survive.

"Trialing in the field will give a more realistic view of how the variety will truly perform," Amanda continued. "In locations used year after year we can actually observe the degree of evolution of the disease. The combined results (of both lab and field) give us a very clear answer of what to advance."

In cooperation with Syngenta's Crop Protection Department, and under the direction of Dr. Catherine Long and Dr. Charles Krasnow, all newly developed Cora hybrids are trialed in in-ground field trials in a heavily disease-saturated Florida location. It's important to keep in mind that in addition to Phytophthora, high levels of various other fungal pathogens are also naturally found in the trial beds, creating an even more rigorous trial.



Pictured: Cora XDR Orchid seedlings vs. other disease-resistant orchid vinca seedlings. Left to right: Cora XDR Orchid seedlings, competitor orchid variety seedlings, and Cora XDR Orchid (left) vs. the competitor orchid variety (right).

By mid-season, the field-test results are clear. This is one of multiple field tests strategically performed in leading vinca market locations. Results are then calculated and added to the multiple other data shares to create a complete picture of how each candidate will perform for the end consumer.

Disease data from the laboratory inoculations and from the various field locations are an important factor when choosing varieties for the XDR series, but a high level of importance is also placed on key phenotypic attributes, such as uniformity, branching, flower size and floriferousness. Nothing is spared at the cost of disease resistance. Cora XDR is not only tough as nails under disease pressure, but the series is also easy for growers to produce top-quality crops for retail. Consumers benefit with beautiful and resilient flowers for their gardens proven by the top scores Cora XDR has earned in multiple public flower trials across the country.

H. Brent Pemberton, professor and Regents Fellow at Texas A&M AgriLife Research and Extension Center, has trialed Cora XDR for years and said regarding its performance: "Cora XDR have and continue to be among the best in the Texas A&M Overton Trials, year in and year out. Their strong performance in the statewide trials under high disease pressure continues to be strong and is the reason they were named Texas Superstar plants a number of years ago.

"The improvement of the original Cora series to include resistance to additional isolates of aerial Phytophthora adds to the importance of the Cora XDR series, as new isolates of this disease can always arise when least expected. In my opinion, the Cora XDR series is the main reason that vinca is one of the most important summer annual crops for this region of the country."

Through rigorous testing of new hybrids in laboratory and field settings, the Cora XDR series continues to evolve, staying ahead of everchanging disease pressure by gaining resistance to a wider array of isolates from across the country, and increasing its resilience and durability with each passing year. **GT**

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