



[Environment Horticulture Program Research Summaries](#)

IR-4 Environmental Horticulture Program XDE-659 Crop Safety

**Author: Cristi L. Palmer
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**Acknowledgements
Susan Bierbrunner**

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Abstract

XDE-659 is a new fungicide being developed by Corteva for the control of Botrytis gray mold, powdery mildew and other foliar pathogens of environmental horticulture crops. The IR-4 Project completed 20 crop safety trials on ten environmental horticulture plant species or genera between 2020 and 2022. No injury has been observed to data on any crop screened so far, including with seven crops where fewer than three trials have been completed and with three crops in at least three trials (*Buxus sempervirens*, *Hemerocallis* sp., *Thuja occidentalis*).

Introduction

XDE-659 is a new fungicide being developed by Corteva for the control of *Botrytis* gray mold, powdery mildew and other foliar pathogens of environmental horticulture crops. The IR-4 Project completed 20 crop safety trials on ten environmental horticulture plant species or genera between 2020 and 2022.

Materials and Methods

XDE-659 was applied three times as a foliar spray at a 7-day interval. The application rates were 20.6 (1X), 41.2 (2X) and 82.4 (4X) fl oz /100 gallons of water. A minimum of four plants per three blocks or ten plants per completely randomized design were required with many researchers exceeding this minimum. Phytotoxicity was recorded on a scale of 0 to 10 (0 = no phytotoxicity; 10 = complete kill) at 1, 2, 3, 4, 5 and 6 weeks after initial application. To view the more detailed materials and methods in the protocol 20-011, 21-011 and 22-014, please see <https://www.ir4project.org/ehc/ehc-registration-support-research/env-hort-researcher-resources/#Protocols> to view and download protocols.

XDE-659 was supplied to researchers (See list of researchers in Appendix 1) by Corteva.

Results and Summary

Phytotoxicity

Based on the type and nature of injury seen with pesticide applications, tested plant species were placed into four categories: 1) no significant phytotoxicity or growth differences from the untreated check or any injury was transitory, 2) no or minimal transitory injury seen at the 1X rate, but the 2X and/or 4X rates did cause significant phytotoxicity, 3) significant injury at the 1X rate sufficient to recommend growers not utilize XDE-659, and 4) more data are needed to make informed recommendations.

XDE-659 exhibited no or minimal negative impact on three crops in at least three trials (Table 1). No injury has been observed to data on any crop screened so far, including with seven crops where fewer than three trials have been completed. (Tables 2 - Table 6).

Please see Table 6 for a list of individual trial summaries for XDE-659.

Table 1. List of XDE-659 treated crops with no or minimal transitory injury.

Buxus sempervirens
Hemerocallis sp.
Thuja occidentalis

Table 2. List of XDE-659 treated crops with no injury at 1X but significant injury at 2X or 4X.

None

Table 3. List of XDE-659 treated crops with significant injury at 1X.

None

Table 4. List of XDE-659 treated crops where more information is needed.

None

Table 5. List of XDE-659 treated crops with less than 3 trials.

Buddleia alternifolia
Forsythia sp.
*Hydrangea sp.*¹
*Nephrolepis exaltata*¹

Rosa sp.
Spiraea japonica
*Trachelospermum jasminoides*¹

¹For these plants, the two trials presented here indicate no phytotoxicity or slight, transient injury.

Table 6. Detailed Summary of Crop Safety Testing with XDE-659.

Notes: Table entries are sorted by crop Latin name. Only those trials with research reports received by 12/20/2022 are listed below.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
34118	Butterfly Bush, Silver (<i>Buddleia alternifolia</i>)	Field Container	Wade	SC	2020	Foliar	No injury and growth reduction with 20.6, 41.2 and 82.4 fl oz per 100 gal applied 3 times biweekly. All plants marketable.
34342	Boxwood, Common (<i>Buxus sempervirens</i>)	Field Container	Fraelich	GA	2022	Foliar	No injury and no impact on growth with 20.6, 41.2 and 82.4 fl oz per 100 gal.
34342	Boxwood, Common (<i>Buxus sempervirens</i>)	Field Container	Grunwald	OR	2021	Foliar	No injury, growth or flowering reduction when applied at 20.6, 41.2, and 82.4 fl oz per 100 gal rates
34342	Boxwood, Common (<i>Buxus sempervirens</i>)	Field Container	Wade	SC	2021	Foliar	No injury at 26.6, 41.2 or 82.4 fl oz per 100 gal applied 3 times at 2 week intervals.
34112	Forsythia (<i>Forsythia</i> sp.) 'Gold Tide'	Field Container	Grunwald	OR	2020	Foliar	No injury, growth or flowering reduction at 20.6, 41.2, and 82.4 fl oz per 100 gal rates
34116	Daylily (<i>Heemerocallis</i> sp.) 'Stella de Oro'	Field Container	Fraelich	GA	2020	Foliar	No injury or significant growth reduction with 20.6, 41.2 and 82.4 fl oz per 100 gal applied 3 times; all treated plants marketable.
34116	Daylily (<i>Heemerocallis</i> sp.) 'Chicago Apache' & 'Little Grappette'	Field Container	Hausbeck	MI	2020	Foliar	No injury or adverse effects on crop growth with 20.6, 41.2 and 82.4 fl oz per 100 gal applied 3 times biweekly.
34116	Daylily (<i>Heemerocallis</i> sp.)	Field Container	Wade	SC	2020	Foliar	No injury and growth reduction with 12.6, 41.2 and 82.4 fl oz per 100 gal applied 3 times biweekly. All plants marketable.
34114	Hydrangea (<i>Hydrangea</i> sp.) <i>H. macrophylla</i> 'Nikko Blue'	Field Container	Baysal-Gurel	TN	2020	Foliar	No injury or growth reduction with 20.6, 41.2 and 82.4 fl oz per 100 gal applied 3 times biweekly.
34114	Hydrangea (<i>Hydrangea</i> sp.) 'Gatsby Gal'	Field Container	Beckerman	IN	2020	Foliar	No injury with 20.6, 41.2 and 82.4 fl oz per 100 gal applied 3 times biweekly.
34114	Hydrangea (<i>Hydrangea</i> sp.)	Field Container	Wade	SC	2020	Foliar	No injury and growth reduction with 12.6, 41.2 and 82.4 fl oz per 100 gal applied 3 times biweekly. All plants marketable.
34121	Fern, Boston Sword (<i>Nephrolepis exaltata</i>) 'Boston Fern'	Field Container	Grunwald	OR	2021	Foliar	No injury, growth or flowering reduction at 20.6, 41.2, and 82.4 fl oz per 100 gal rates
34121	Fern, Boston Sword (<i>Nephrolepis exaltata</i>)	Field Container	Wade	SC	2020	Foliar	No injury and growth reduction with 12.6, 41.2 and 82.4 fl oz per 100 gal applied 3 times biweekly. All plants marketable.
34119	Rose (<i>Rosa</i> sp.)	Field Container	Wade	SC	2020	Foliar	No injury and growth reduction with 20.6, 41.2 and 82.4 fl oz per 100 gal applied 3 times biweekly. All plants marketable.
34115	Japanese Meadowsweet (<i>Spiraea japonica</i>) 'Little Princess'	Field Container	Grunwald	OR	2020	Foliar	No injury, growth or flowering reduction at 20.6, 41.2, and 82.4 fl oz per 100 gal rates
34113	Arborvitae, American (<i>Thuja occidentalis</i>)	Field Container	Baysal-Gurel	TN	2020	Foliar	No injury or growth reduction with 20.6, 41.2 and 82.4 fl oz per 100 gal applied 3 times biweekly.
34113	Arborvitae, American (<i>Thuja occidentalis</i>) 'American Arb' & 'Nigra'	Field Container	Hausbeck	MI	2020	Foliar	No injury or adverse effects on crop growth with 20.6, 41.2 and 82.4 fl oz per 100 gal applied 3 times biweekly.
34113	Arborvitae, American (<i>Thuja occidentalis</i>)	Field Container	Wade	SC	2020	Foliar	No injury and growth reduction with 20.6, 41.2 and 82.4 fl oz per 100 gal applied 3 times biweekly. All plants marketable.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
34120	Jasmine, Confederate (Trachelospermum jasminoides) 'Confederate Star'	Field Container	Grunwald	OR	2020	Foliar	No injury, growth or flowering reduction at 20.6, 41.2, and 82.4 fl oz per 100 gal rates
34120	Jasmine, Confederate (Trachelospermum jasminoides)	Field Container	Wade	SC	2020	Foliar	No injury and growth reduction with 20.6, 41.2 and 82.4 fl oz per 100 gal applied 3 times biweekly. All plants marketable.

Label Suggestions

We recommend that the following crops, which exhibited no injury in these experiments, be added to the future XDE-659 label in a section of crops where no adverse effects have been observed after foliar applications.

Buxus sempervirens

Hemerocallis sp.

Thuja occidentalis

Appendix 1: Contributing Researchers

Dr. Fulya Baysal-Gurel	Tennessee State University McMinnville, TN 37110
Dr. Janna L. Beckerman	Purdue University Department of Botany and Plant Pathology West Lafayette, IN 47907
Mr. Ben Fraelich	USDA-ARS CPES P.O. Box 748 Tifton, GA 31793
Dr. Nik Grunwald	USDA-ARS Horticultural Crops Research 3420 NW Orchard Ave Corvallis, OR 97330
Dr. Mary Hausbeck	Michigan State University Dept. of Plant Pathology 140 Plant Pathology Building East Lansing, MI 48824
Mr. Paul Wade	USDA-ARS US Vegetable Laboratory 2700 Savannah Highway Charleston SC 29414