



This is a section from the

2018

Mid-Atlantic

Commercial Vegetable

Production Recommendations

The manual, which is published annually, is **NOT** for home gardener use.

The **full manual**, containing recommendations specific to New Jersey, can be found on the Rutgers NJAES website in the Publications section:

<http://njaes.rutgers.edu/pubs/publication.asp?pid=E001>.

The **label** is a legally-binding contract between the user and the manufacturer. The user must follow all rates and restrictions as per label directions. The use of any pesticide inconsistent with the label directions is a violation of Federal law.

Cooperating Agencies: Rutgers, The State University of New Jersey, U.S. Department of Agriculture, and County Boards of Chosen Freeholders. Rutgers Cooperative Extension, a unit of the Rutgers New Jersey Agricultural Experiment Station, is an equal opportunity program provider and employer.

2018
**Mid-Atlantic Commercial Vegetable
Production Recommendations**

Delaware

University of Delaware Cooperative Extension (EB137)

Maryland

University of Maryland Extension (EB-236)

New Jersey

Rutgers Cooperative Extension (E001)

Pennsylvania

Penn State Extension (AGRS-028)

Virginia

Virginia Cooperative Extension (456-420)

West Virginia

West Virginia University Extension Service

**For Immediate Medical Attention
Call 911**

**For a Pesticide Exposure Poisoning
Emergency Call**



For All States

This number will automatically connect you to the poison center nearest you.

Anyone with a poisoning emergency can call the toll-free telephone number for help.

Personnel at the Center will give you first-aid information and direct you to local treatment centers if necessary.

For Pesticide Spills

Small Spills: See the product label for cleanup advice.

Large spills: Call the National Response Center at 1-800-424-8802 or CHEMTREC at 800-424-9300 (24 hours) - Industry assistance with emergency response cleanup procedures for large, dangerous spills.

Be aware of your responsibility to report spills to the proper state agency.

Preface

NOT TO BE USED BY HOME GARDENERS

This copy of the **Mid-Atlantic Commercial Vegetable Production Recommendations for 2018** replaces all previous editions of the Commercial Vegetable Production Recommendations published individually for Delaware, Maryland, New Jersey, Pennsylvania, Virginia, and West Virginia. Information presented in this publication is based on research results from the University of Delaware, the University of Maryland, Rutgers - The State University of New Jersey, The Pennsylvania State University, Virginia Polytechnic Institute and State University, West Virginia University, and the U.S. Department of Agriculture, combined with industry and grower knowledge and experience.

This vegetable production guide is intended for the **commercial vegetable grower** who has to make numerous managerial decisions. Although the proper choices of variety, pesticides, equipment, irrigation, fertilizer, and cultural practices are the individual vegetable grower's responsibility, it is intended that these recommendations will facilitate decision-making. Recommended planting dates will vary across the six-state region. Local weather conditions, grower experience, and variety may facilitate successful harvest on crops planted outside the planting dates listed in this guide. This can be evaluated in consultation with the local agents and state specialists. Government agencies and other organizations administering crop insurance programs or other support programs should contact local Extension agents and/or vegetable specialists for guidance.

The publication will be revised annually or as is necessary to include new information that evolves in the rapidly changing vegetable industry. Important updates will be communicated through local Extension agents and vegetable specialists. The Editors welcome constructive criticism and suggestions from growers and industry personnel who may wish to help improve future editions of this publication.

DISCLAIMER

- The label is a legally-binding contract between the user and the manufacturer.
- The user **MUST** follow all rates and restrictions as per label directions.
- The use of any pesticide inconsistent with the label directions is a violation of Federal law.

Pesticide User Responsibility

Always follow the label and use pesticides safely. For special Local-Needs Label 24(c) registrations or Section 18 exemptions, do not use the material without a copy of the special label or written instructions from your Extension Agent or another recognized authority. **The user is always responsible for the proper use of pesticides, residues on crops, storage and disposal, as well as for damage caused by drift.**

State and federal pesticide regulations are constantly under revision. Be sure to determine if such changes apply to your situation. Using pesticides inconsistent with label directions is illegal.

Days Between Last Application and Harvest

The minimum number of days between the last application and harvest (**PHI**, Pre-Harvest Interval, in days) and reentry information (**REI**, Restricted Entry Interval, in hours) are listed in the herbicide, insecticide and fungicide recommendation tables in chapter F. Commodity Recommendations. This information is also listed by chemical in chapter D. Pesticide Safety (Table D-6. Acute Toxicity of Chemicals). Always follow the label to avoid the occurrence of deleterious chemical residues on harvested crops.

Trade or Brand Names

The trade or brand names given herein are supplied with the understanding that no discrimination is intended and no endorsement is implied. Furthermore, in some instances the same compound may be sold under different trade names, which may vary as to label clearances. For the convenience of our users, both product names and active ingredients are provided and any product name omissions are unintended.

Coordinators and Editors

2018 Mid-Atlantic Commercial Vegetable Production Recommendations

Coordinators

C.A. Wyenandt, Ph.D.

Extension Specialist in Vegetable Pathology (Rutgers University)

M.M.I. van Vuuren Ph.D. (Rutgers University)

Discipline Editors

Entomology

Thomas P. Kuhar, Ph.D. (Virginia Tech)

Pesticides

George C. Hamilton, Ph.D. (Rutgers University)

Weed Science

Mark J. VanGessel, Ph.D. (University of Delaware)

Horticulture

Elsa Sánchez, Ph.D. (Pennsylvania State University)

Plant Pathology

C.A. Wyenandt, Ph.D. (Rutgers University)

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contributors by State

These recommendations were prepared and reviewed by the following individuals from respective institutions with the purpose of providing up to date information for commercial vegetable growers in the mid-atlantic states of Delaware, Maryland, New Jersey, Pennsylvania, Virginia, and West Virginia.



University of Delaware

Horticulture

E. Ernest

G.C. Johnson

Weed Science

M.J. VanGessel

K. Vollmer

Pathology

N.M. Kleczewski



Rutgers University

Horticulture

J.A. Grande

M. Infante-Casella

W. Kline

T.J. Orton

R.W. VanVranken

Weed Science

T. Besançon

Entomology

K. Holmstrom

J. Ingerson-Mahar

Pathology

C.A. Wyenandt

Pesticide Safety

G.C. Hamilton

P.D. Hastings



Virginia Tech

Weed Science

C. Cahoon

Entomology

H.B. Doughty

T.P. Kuhar

Pathology

R.A. Arancibia

D.B. Langston



University of Maryland

Entomology

G.E. Brust

Pathology

K.L. Everts



PennState

PennState

Horticulture

K. Demchak

T.E. Elkner

E. Sánchez

Weed Science

D. Lingenfelter

Entomology

S.J. Fleischer

D. Roberts

Pathology

B.K. Gugino



West Virginia University

Pathology

M.M. Rahman

State Extension Information

DELAWARE

University of Delaware

University of Delaware Agricultural Extension: <http://extension.udel.edu/ag/>

Vegetable Program Trial Reports, Publications, and Budgets:

<http://extension.udel.edu/ag/vegetable-fruit-resources/vegetable-small-fruits-program/>

Weekly Crop Update Newsletter: <http://extension.udel.edu/weeklucropupdate/>

Insect Trap Program: <http://extension.udel.edu/ag/insect-management/insect-trapping-program/>

UD Plant Diagnostic Clinic: <http://extension.udel.edu/ag/plant-diseases/ud-plant-diagnostic-clinic>

Statewide

Gordon Johnson, Fruit and Vegetable Crops Specialist, 302-856-7303, gcjohn@udel.edu

Emmalea Ernest, Associate Scientist, Vegetables, 302-856-7303, emmalea@udel.edu

Mark VanGessel, Weed Specialist, 302-856-7303, mjv@udel.edu

Kathryne Everts, Vegetable Plant Pathology Specialist, 410-742-8780, everts@udel.edu

David Owens, Entomology/IPM Specialist, 302-856-7303, owensd@udel.edu

Nancy Gregory, Plant Diagnostician/ Diagnostic Lab Coordinator, 302-831-1390, ngregory@UDel.edu

County Offices

New Castle County: Carrie Murphy, 302-831-2506, cjmurphy@udel.edu

New Castle County: Dan Severson, 302-831-2506, severson@udel.edu

Kent County: Phillip Sylvester, 302-730-4000, phillip@udel.edu

Sussex County: Tracy Wootten, 302-856-7303, wootten@udel.edu

Sussex County: Cory Whaley, 302-856-7303, whaley@udel.edu

MARYLAND

University of Maryland

UMd Ag Extension: <http://extension.umd.edu/topics/agriculture>

Maryland Vegetables: <http://extension.umd.edu/mdvegetables>

Vegetable & Fruit Headline News:

<http://extension.umd.edu/anne-arundel-county/agriculture/vegetable-fruit-headline-news>

University of Maryland Extension Specialists

Amy E. Brown, Pesticide Coordinator

Cerruti R. R. Hooks, IPM and Insect Ecology

Galen Dively (Emeritus), Entomology and IPM

Wye Research and Education Center Robert J. Rouse (Emeritus), Horticulture Specialist

Lower Eastern Shore REC-Salisbury Kathryne L. Everts, Plant Pathologist

Central Maryland REC-Upper Marlboro Gerald E. Brust, IPM Vegetable Specialist

University of Maryland Plant Diagnostic Lab

Karen Rane

<https://extension.umd.edu/plantdiagnosticlab>

Department of Entomology

4112 Plant Sciences Building, College Park, MD 20742

301-405-1611

State Extension Information

NEW JERSEY

Rutgers, The State University of New Jersey

New Jersey Agricultural Experiment Station: <http://njaes.rutgers.edu/ag/>

Fact Sheets and Bulletins: <http://goo.gl/PyBwOb>

Plant & Pest Advisory: <http://plant-pest-advisory.rutgers.edu>

Mid-Atlantic Commercial Vegetable Production Recommendations:
<http://njaes.rutgers.edu/pubs/publication.asp?pid=E001>

Pesticide Applicator Certification Information, NJ DEP Pesticide Control Program
<http://www.nj.gov/dep/enforcement/pcp/bpo-appprivate.htm#part2>

Rutgers NJAES Extension Specialists

A.J. Both, Specialist in Controlled Environment Engineering, 848-932-9534, both@envsci.rutgers.edu

Thomas Orton, Specialist in Vegetables, 732-932-4000, orton@njaes.rutgers.edu

George Hamilton, Specialist in Pest Management, 848-932-9801, hamilton@njaes.rutgers.edu

C.A. Wyenandt, Specialist in Vegetable Pathology, 732-932-4000, wyenandt@njaes.rutgers.edu

Joseph Heckman, Specialist in Soil Fertility, 848-932-6333, heckman@njaes.rutgers.edu

For a complete listing of Extension Specialist Personnel, see: <https://njaes.rutgers.edu/es/>

Rutgers Cooperative Agricultural Extension Agents

Atlantic County, Richard VanVranken; Burlington County, Bill Bamka; Cape May County, Jenny Carleo;

Cumberland County, Wesley Kline; Gloucester County, Michelle Infante-Casella; Hunterdon County,

Megan Muehlbauer; Mercer County, Meredith Melendez; Middlesex County, Bill Hlubik;

Monmouth County, Bill Sciarappa; Morris County, Peter Nitzsche; Passaic County, Amy Rowe;

Salem County, Dave Lee; Somerset County, Nick Polanin; Sussex County, Steve Komar.

For a complete listing of Cooperative Extension County Offices, see: <https://njaes.rutgers.edu/county/>

Rutgers NJAES Plant Diagnostic Lab and Nematode Detection Service

<http://njaes.rutgers.edu/plantdiagnosticlab/>; clinic@njaes.rutgers.edu

20 Indyk-Engel Way, North Brunswick, NJ 08902, phone: 732-932-9140, fax: 732-932-1270,

Rutgers Soil Testing Lab <http://njaes.rutgers.edu/soiltestinglab/>

57 US Highway 1, New Brunswick, NJ 08901, 848-932-9295, soiltest@njaes.rutgers.edu

PENNSYLVANIA

The Pennsylvania State University

Penn State Extension including publications, fact sheets, and more: <http://extension.psu.edu>

Penn State Vegetable Production: <https://extension.psu.edu/forage-and-food-crops/vegetables>

Vegetable and Small Fruit Gazette newsletter, click on the "Get Connected" button at:

<https://extension.psu.edu/forage-and-food-crops/vegetables>

Penn State Vegetable Team Directory

For complete listing and contact information see:

<https://extension.psu.edu/forage-and-food-crops/vegetables/vegetables-experts>

Plant Diagnostic Clinic: <http://plantpath.psu.edu/facilities/plant-disease-clinic>

220 Buckhout Laboratory

University Park, PA 16802

Phone: 814-865-2204

State Extension Information

VIRGINIA

Virginia Tech & Virginia State University

Virginia Cooperative Extension (VCE): <https://ext.vt.edu/>

VCE Publications and Educational Resources: <http://pubs.ext.vt.edu/> and <https://ext.vt.edu/agriculture.html>

Virginia Tech Pesticide Programs (VTPP): <http://vtpv.ext.vt.edu>

Virginia Extension Specialists

Ramón A. Arancibia, Assistant Professor, Horticulture

Mark S. Reiter, Associate Professor, Nutrient Management

Steve L. Rideout, Associate Professor, Plant Pathology

Tom P. Kuhar, Professor, Entomology

Laura K. Strawn, Assistant Professor, Food Microbiology

Charles W. Cahoon, Assistant Professor, Weed Science

James A. Parkhurst, Associate Professor, Wildlife

David B. Langston, Jr., Professor, Plant Pathology

R. Allen Straw, Area Specialist, Horticulture

Jayesh Samtani, Area Specialist, Small Fruit

Plant Disease Clinic

106 Price Hall, 170 Drillfeld Drive, Virginia Tech Blacksburg, VA 24061-0331

Phone: 540-231-6758, Fax: 540-231-7477, clinic@vt.edu.

Or contact the local VCE office

WEST VIRGINIA

West Virginia University Extension Service:

<https://extension.wvu.edu/agriculture/horticulture>

West Virginia University Extension Specialists

Lewis W. Jett, Ph.D, Extension Horticulture Specialist

G215 Agriculture Sciences Building, Morgantown, WV 26506-6103, 304-293-2634

Rakesh S. Chandran, Ph.D, Extension Weed Specialist and IPM Coordinator

3417 Agriculture Sciences Building Morgantown, WV 26506-6108, 304-293-2603

MM (Mahfuz) Rahman, PhD, Extension Plant Pathology Specialist

G101 South Ag. Sciences Building, Morgantown, WV 26506-6108, 304-293-8838

Plant Diagnostic Clinic

<https://extension.wvu.edu/lawn-gardening-pests/plant-disease/plant-diagnostic-clinic>

G102 South Ag. Sciences Building, PO Box 6108, Morgantown, WV 26506-6108

Phone: 304-293-8838/288-9541, mm.rahman@mail.wvu.edu

Soil Testing Lab <https://soiltesting.wvu.edu>

1309-B Agricultural Sciences Bldg., P.O. Box 6108, Morgantown, WV 26506-6108,

Phone: 304-293-6023, infoplantsoil@mail.wvu.edu

Table of Contents

Preface	i
Coordinators and Editors	ii
Contributors by State	iii
State Extension Information	iv
Table of Contents	vii
Listing of Tables	x
Abbreviations and Acronyms	xi

Chapter	Section	Title	Page
A General Production Recommendations	1	Varieties	1
	2	Seed Storage and Handling	2
	3	Specialty Vegetables	2
	4	Organic Production	3
	5	Transplant Production	3
	6	Conservation Tillage Crop Production	8
	7	Mulches and Row Covers	8
	8	Staking and Trellising	11
	9	High Tunnels	11
	10	Greenhouse Production	13
	11	Wildlife Damage Prevention	14
	12	Pollination	21
	13	Food Safety Concerns	26
B Soil and Nutrient Management	1	Soils	29
	2	Liming Soils	29
	3	Plant Nutrients	33
	4	Nutrient Management	36
	5	Soil Improvement and Organic Nutrient Sources	43
C Irrigation Management	1	Basic Principles	47
	2	Drip (Trickle) Irrigation	49
	3	Fertigation	54
	4	Subsurface Drip Irrigation Systems	55
	5	Chemigation	55
D Pesticide Safety	1	General Information	57
	2	Handling Pesticides	57
	2.1	Introduction	57
	2.2	Applying Pesticides	58
	2.3	Pesticide Transport	58
	2.4	Pesticide Storage	58
	2.5	Disposal of Pesticides	60
	2.6	Disposal of Containers	60
	3	Soil Fumigants	61
	4	Farm Worker Safety	61
	4.1	Regulations	61
	4.2	Protecting Yourself from Pesticides	63
	4.3	Respiratory Protective Devices for Pesticides	65
	4.4	Pesticide Poisoning	67

Table of Contents - continued

Chapter	Section	Title	Page
D Pesticide Safety <i>(continued)</i>	5	Protect the Environment	67
	5.1	General Guidelines	67
	5.2	Notification of Beekeepers	68
	5.3	Protecting Your Groundwater	68
	5.4	Pesticide Spills	70
	6	Toxicity of Chemicals	71
E Pest Management	1	How to Improve Pest Management	85
	1.1	Recommendations for More Effective Pest Control	85
	1.2	Calibrating Field Sprayers	89
	1.3	Calibrating Granular Applicators	90
	1.4	Pesticide Drift and Misapplication	91
	1.5	Soil Fumigation	92
	1.6	Nematode Control	92
	2	Weed Control	96
	2.1	Postharvest Perennial Weed Control	96
	2.2	Herbicide Effectiveness on Common Weeds in Vegetables	96
	2.3	Crop Rotation Planting Restrictions	99
	2.4	Prepackaged Herbicide Mixtures	108
	2.5	Herbicide Site of Action: Reducing the Risk of Herbicide Resistance	109
	3	Insect Control	111
	3.1	Soil Pests - Detection and Control	111
	3.2	Insecticide Mode of Action: Reducing the Risk of Insecticide Resistance	113
	3.3	Insect Pest and Mite Control for Greenhouse Production	113
	4	Disease Control	117
	4.1	Fungicide Mode of Action: Reducing the Risk of Fungicide Resistance	117
	4.2.	Fungicides Registered for Vegetables	117
4.3	Disease Control in Seeds, Plant Growing Mix and Plant Beds	123	
4.4	Disease Control for Greenhouse Production	124	
F Commodity Recommendations <i>(commodities listed in alphabetical order)</i>		Pesticide Use Disclaimer	127
		Asparagus	128
		Beans (Snap and Lima)	137
		Beets (Garden)	151
		Carrots	155
		Celery	161
		Cole Crops (Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Collards, Kale and Kohlrabi)	167
		Cucumbers	184
		Eggplant	198
		Garlic	207
		Greens (Mustard and Turnip)	213
		Horseradish	218
		Leeks	223
		Lettuce, Endive and Escarole	228

Table of Contents - continued

Chapter	Section	Title	Page
F Commodity Recommendations <i>(commodities listed in alphabetical order) - continued</i>		Muskmelons and Mixed Melons	236
		Okra	250
		Onions	255
		Parsley	264
		Parsnips	269
		Peas (Succulent)	272
		Peppers	278
		Potatoes	295
		Pumpkins and Winter Squash	309
		Radishes, Rutabagas and Turnips	324
		Specialty Vegetables	330
		Spinach	335
		Strawberries	341
		Summer Squash	354
		Sweet Corn	367
	Sweet Potatoes	383	
	Tomatoes	388	
	Watermelons	409	
G Resources and Records	1	Resources	427
	1.1	Vegetable Seed Sizes	427
	1.2	Plant Spacings and Populations	427
	1.3	Frequently Used Weights and Measures	428
	1.4	Making a Plant-Growing Mix	428
	2	Records	430
	2.1	Pesticide Application Record	430
	2.2.	Pesticide Registration Numbers Record	432

Listing of Tables

Table	Title	Page
A-1	Temperature, and Planting Recommendations for Transplant Production	4
A-2	Planting and Harvesting Schedule for Freestanding High Tunnel Vegetable Crop Production	13
B-1	Target Soil pH Values for Vegetable Crop Production	30
B-2	Pounds of Calcium Carbonate Equivalent (CCE) Recommended per Acre	31
B-3	Conversion of Recommended Calcium Carbonate Equivalent to Recommended Limestone	31
B-4	Soil Test Categories for Nutrients Extracted by Mehlich 3 and 1	35
B-5	Composition of Principal Macronutrient Fertilizer Materials	38
B-6	Chemical Sources of Secondary and Micronutrients	38
B-7	Boron Recommendations Based on Soil Tests for Vegetable Crops	39
B-8	Recommendations for Correction of Vegetable Crop Nutrient Deficiencies	41
B-9	Sufficiency Ranges for Fresh Petiole Sap Concentrations in Vegetable Crops	41
B-10	Plant Nutrient Value Credits to Be Allowed for Manure Applications and Crop Residues	45
B-11	Status for Organic Production, Mineral Nutrient Value, and Relative Availability of Various Materials	46
C-1	Most Critical Periods of Water Needs by Crops	47
C-2	Available Water Holding Capacity Based on Soil Texture	48
C-3	Soil Infiltration Rates Based on Soil Texture	48
C-4	Hours Required to Apply 1 Inch of Water for Fine-Textured or Heavy Soils	49
C-5	Hours Required to Apply 1 Inch Water for Course-textured or Light Soils	50
C-6	Maximum Number of Minutes per Application for Drip Irrigated Vegetables	50
C-7	Irrigation Guidelines for Tensiometers	51
C-8	Equivalent Injection Proportions	53
C-9	Using Insecticides with Labels for Chemigation	56
D-1	Deterioration of Pesticides	59
D-2	Winter Storage of Chemicals	59
D-3	K_d , K_{oc} , Water Solubility and Persistence Values for Selected Pesticides	69
D-4	Acute Categories of Toxicity	71
D-5	LD_{50} Figures Converted to Ounces for Three Commonly Used Products in Agriculture	71
D-6	Acute Toxicity of Chemicals	72
E-1	Ground Speed Conversion	89
E-2	Herbicide Effectiveness on Common Weeds in Vegetables	96
E-3	Crop Rotation Planting Restrictions	99
E-4	Prepackaged Herbicide Mixtures Available for Various Vegetable Crops and the Components of the Mixtures	108
E-5	Important Herbicide Groups for Commercial Vegetables	109
E-6	Insecticides and Miticides Labeled for Use on Greenhouse Vegetables	114
E-7	FRAC Codes and Corresponding Chemical Groups for Commonly-Used Fungicides	117
E-8	Commonly Used Fungicides Registered for Vegetables	118
E-9	Effective Seed Treatment Temperature Protocols (2 nd Bath) For Pathogen Eradication	123
E-10	Selected Fungicides and Bactericides Labeled for Greenhouse Use	124
G-1	Vegetable Seed Sizes	427
G-2	Plant Spacings and Populations	427
G-3	Frequently Used Weights and Measures	428
G-4	Simple Plant-Growing Mix	429
G-5	Preferred Plant-Growing Mix	429

Abbreviations and Acronyms

Units of Measurement

/A	per acre
bu	bushel(s)
°C	degrees Celsius
cc	cubic centimeter(s)
cu ft	cubic foot (feet)
cu yd	cubic yard(s)
cwt	hundredweight
d	day(s)
°F	degrees Fahrenheit
ft	foot (feet)
fl oz	fluid ounce(s)
g	gram(s)
gal	gallon(s)
gpm	gallons per minute
in	inch
lb	pound(s)
mph	miles per hour
oz	ounce(s)
ppm	parts per million
psi	pounds per square inch
pt	pint(s)
qt	quart(s)
sq ft	square foot (feet)
tbs	tablespoon(s)
tsp	teaspoon(s)
wk	week(s)
yr	year(s)

Product Formulations

COC	crop oil concentrate
D	dust
DF	dry flowable
DP	dry prill
DS	dry salt
E	emulsion
EC	emulsifiable concentrate
ES	emulsifiable suspension
EW	emulsion in water
F	flowable
FC	flowable concentrate
FL	fluid
FM	flowable micro-encapsulated
G	granule
L	liquid
LC	liquid concentrate
LF	liquid flowable
ME	micro-encapsulated

OF	oil formulation
OLF	other labeled formulations
<i>Product Formulations - continued</i>	
SC	spray concentrate, soluble concentrate
SG	soluble granules
SP	soluble powder
W	wettable
WBE	water-based emulsion
WDG	water-dispersible granules
WDL	water-dispersible liquid
WP	wettable powder
WSB	water-soluble bag
WSP	water-soluble packet

Diseases

AMV	alfalfa mosaic virus
EBDC	early blight disease control
FR	Fusarium wilt resistance
LR	leaf roll resistant
MT	mosaic tested
PMR	powdery mildew resistant
PMT	powdery mildew tolerant
PR	Phytophthora resistance
PT	Phytophthora tolerant
PVX	potato virus X
PVY	potato virus Y
WMV	watermelon mosaic virus
WMV2	watermelon mosaic virus race2
WRR	white rust resistance
ZYMV	zucchini yellow mosaic virus

Other

ai	active ingredient
AP	at planting
ALS	acetolactate synthase
AMS	ammonium sulfate
FRAC	Fungicide Resistance Action Committee
IRAC	Insecticide Resistance Action Committee
K	potassium
K ₂ O	available potash
N	nitrogen
OMRI	Organic Materials Research Institute
P	phosphorus
P ₂ O ₅	available phosphoric acid
PHI	Pre Harvest Interval (in days)
REI	Restricted Entry Interval (in hours)
WSSA	Weed Science Society of America