

# 2019 Fungicide Spray Guide for Tomato in North Carolina

Inga Meadows, Department of Entomology & Plant Pathology

NC STATE

EXTENSION



Fig 1. Tomato diseases (left to right): bacterial spot on tomato fruit and tomato leaf; early blight and late blight on tomato leaf.

The purpose of this suggested schedule is to provide a general spray program, which can be altered depending on disease pressure, weather conditions, and grower preference in products.

**Volume-based Spray Schedule.** The following suggested weekly spray schedule (Table 1) accounts for the above considerations and label restrictions of different products and is based on years of field research in NC. Labeled rates of products are usually listed on a **per acre basis**, but for staked tomatoes, these should be applied on a **per volume basis**. The purpose of spraying on a per volume basis is that less volume (and thus, less product) is needed to obtain full coverage when the plants are small early in the season; later in the season, when plants are larger, more spray volume is needed to obtain full coverage. First, determine the maximum spray volume per acre for your sprayer for fully-grown plants. Then, mix the acre rate for a given product in the maximum spray volume that it takes to cover an acre. For example, mancozeb products are labeled at 3 lbs per acre. If the maximum spray volume is 100 gallons per acre for your sprayer when plants are fully grown, then mix the mancozeb product at the rate of 3 lbs per 100 gallons of spray. At the start of the season, it may take only 30 gallons per acre to obtain full coverage, so the amount of the mancozeb product would be 1.0 lb for 30 gallons. The volume of spray per acre is then increased as plants grow and spray nozzles are added until the maximum volume per acre is reached at full plant growth.

## 2019 Fungicide Spray Guide for Tomato in North Carolina

Disease	Week	Products (Use where <b>LATE BLIGHT</b> is a consistent threat [Mountains])
<b>Before harvest:</b> (target diseases: <b>early blight</b> , <b>bacterial spot</b> , or <b>both</b> )	1	<b>mancozeb (M) + copper (M) + Actigard (21)</b>
	2	<b>mancozeb (M) + copper (M)</b>
	3	<b>mancozeb (M) + Inspire Super (3+9) OR strobilurin (11) + Actigard (21)</b>
	4	<b>mancozeb (M) + copper (M)</b>
	5	<b>mancozeb (M) + Fontelis (7) OR Endura<sup>z</sup> (7) + Actigard</b>
	6	<b>mancozeb (M) + copper (M)</b>
	7*	<b>mancozeb (M) + Inspire Super (3+9) OR strobilurin<sup>y</sup> (11) + Actigard (21)</b>
	8*	<b>mancozeb (M) + copper (M)</b>
<b>During harvest:</b> (target diseases: <b>early blight</b> , <b>late blight</b> , or <b>both</b> ; or gray mold)	9	<b>Fontelis (7) OR Endura<sup>z</sup> (7) + chlorothalonil (M)</b>
	10	<b>Revus Top (3+40) OR Presidio (43) OR Ranman (21) OR Orondis Ultra (49+40)</b>
	11	<b>[Inspire Super<sup>x</sup> (3+9)] OR strobilurin<sup>y</sup> (11) + chlorothalonil (M)</b>
	12	<b>Revus Top (3+40) OR Presidio (43) OR Ranman (21) OR Orondis Ultra (49+40)</b>
	13	<b>Fontelis (7) or Endura<sup>z</sup> (7) + chlorothalonil (M)</b>
	14	<b>Presidio (43) OR Ranman (21) OR Orondis Ultra (49+40) OR chlorothalonil (M)</b>
	15	Finish season with <b>chlorothalonil (M)</b>

\*For late season plantings: If late blight is in the area, consider chlorothalonil for late blight control beginning Week 7 or 8.

<sup>z</sup>Use high rate of **Fontelis** or **Endura** if conditions are cool and wet just before or during harvest when there is risk of gray mold.

<sup>y</sup>Resistance to **strobilurins** is known to occur in the early blight pathogen in NC; if resistance is suspected, avoid the use of strobilurins and use alternate product.

\*Do not use **Inspire Super** in Week 11 if the higher rates of **Inspire Super** and **Revus Top** have been used to avoid exceeding the maximum season limit.

Notes: **Actigard** applications should be limited to reduce the risk of **plant stunting**. **Regalia**, **Lifegard**, and **Serenade** have some efficacy against bacterial spot.

## 2019 Fungicide Spray Guide for Tomato in North Carolina

Disease	Week	Products (Use where <i>EARLY BLIGHT</i> is a consistent threat [Piedmont & East])
<b>Before harvest:</b>	1	<b>mancozeb (M) + copper (M) + Actigard (21)</b>
(target diseases:	2	<b>mancozeb (M) + copper (M)</b>
<b>early blight,</b>	3	<b>mancozeb (M) + Inspire Super (3+9) OR strobilurin (11) + Actigard (21)</b>
<b>bacterial spot,</b>	4	<b>mancozeb (M) + copper (M)</b>
<b>or both)</b>	5	<b>mancozeb (M) + Fontelis (7) OR Endura<sup>z</sup> (7) + Actigard</b>
	6	<b>mancozeb (M) + copper (M)</b>
	7	<b>mancozeb (M) + Inspire Super (3+9) OR strobilurin<sup>y</sup> (11) + Actigard (21)</b>
	8	<b>mancozeb (M) + copper (M)</b>
<b>During harvest:</b>	9	<b>Fontelis (7) OR Endura<sup>z</sup> (7)</b>
(target disease:	10	<b>chlorothalonil (M)</b>
<b>early blight)</b>	11	<b>Inspire Super<sup>x</sup> (3+9) OR strobilurin<sup>y</sup> (11)</b>
	12	<b>chlorothalonil (M)</b>
	13	<b>Fontelis (7) or Endura<sup>z</sup> (7)</b>
	14	Finish season with <b>chlorothalonil (M)</b>

<sup>z</sup>Use high rate of **Fontelis** or **Endura** if conditions are cool and wet just before or during harvest when there is risk of gray mold.

<sup>y</sup>Resistance to **strobilurins** is known to occur in the early blight pathogen in NC; if resistance is suspected, avoid the use of strobilurins and use alternate product.

**Notes:** **Actigard** applications should be limited to reduce the risk of **plant stunting**. **Regalia**, **Lifegard**, and **Serenade** have some efficacy against bacterial spot.

Common name (active ingredient)	FRAC*	PHI (days)	Product name
fixed copper	M01	Varies; check label	(various)
acibenzolar-S-methyl	21	14	Actigard 50WG
mancozeb	M03	5	(various)
<i>Bacillus subtilis</i> strain QST 713 (OMRI)	44	0	Serenade Opti, Serenade ASO
<i>Bacillus mycooides</i> isolate J (OMRI)	P6	0	Lifegard WG
<i>Reynoutria sachalinensis</i> (OMRI)	P5	0	Regalia
difenoconazole + cyprodinil	3+9	0	Inspire Super (GM)
boscalid	7	0	Endura (GM)
penthiopyrad	7	0	Fontelis
fluopyram + pyrimethanil	7+9	1	Luna Tranquility (GM)
pyrimethanil	9	1	Scala
cyprodinil + fludioxonil	9+12	0	Switch
strobilurin (azoxystrobin)	11	0	Quadris
strobilurin (pyraclostrobin)	11	0	Cabrio EG
strobilurin (azoxystrobin) + difenoconazole	11+3	0	Quadris Top
strobilurin (pyraclostrobin) + fluxapyroxad	11+7	7	Priaxor (GM)
strobilurin (trifloxystrobin) + fluopyram	11+7	3	Luna Sensation (GM)
azoxystrobin + chlorothalonil	11+M05	3	Quadris Opti
famoxadone + cymoxanil	11+27	3	Tanos
mandipropamid + difenoconazole	40+3	1	Revus Top
chlorothalonil	M05	0	(various)
chlorothalonil + cymoxanil	M05+27	3	Ariston
chlorothalonil + potassium phosphate	M05+33	0	Catamaran
cyazofamid	21	0	Ranman
propamocarb (S)	28	5	Previcur Flex
fluopicolide (S)	43	2	Presidio
ametoctradin + dimethomorph	45+40	4	Zampro
oxathiapiprolin (S) + mandipropamid	49+40	1	Orondis Ultra (pre-mix)
oxathiapiprolin (S) + chlorothalonil	49+M05	0	Orondis Opti (pre-mix)

\*FRAC=Fungicide Resistance Action Committee code; Products with the same FRAC number do not count as a rotation partner

(OMRI) OMRI Approved product; (GM) This product also controls gray mold.

**(S) This product has systemic activity; it can be used after plants are infected with late blight to slow disease progression.**

**Note:** Recommendations for the use of agricultural chemicals are included here as a convenience to the reader. The use of brand names and mention or listing of commercial products does not imply endorsement by North Carolina State University nor discrimination against similar products or services not mentioned. Individuals who use agricultural chemicals are responsible for ensuring that the intended use complies with current regulations and conforms to the product label. Examine a current product label before applying any chemical. For assistance, contact your county North Carolina Cooperative Extension Service agent.

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