

## Tobacco Disease Management

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### Disease Control Products for Transplant Production (Greenhouse and Outdoor)

Disease	Product	Active ingredient (FRAC code)	Rate	Remarks*
Angular leaf spot, wildfire, blue mold (suppression)	Agricultural streptomycin (Agri-Mycin 17, Harbour)	streptomycin sulfate (25)	1-2 tsp/gal 8-16 oz/100 gal (100-200 ppm)	Apply in 3-5 gal/1,000 sq ft. Begin applications when plants are dime-sized or larger and repeat at 5-7 day intervals until disease is under control. Also aids in control of black leg and bacterial soft rot if applied in sufficient spray volume to run down stem.
Anthrachnose, blue mold, Rhizoctonia damping off, target spot (suppression)	Mancozeb (Manzate ProStick)	mancozeb (M03)	0.5 lb./100 gal	Apply 3-12 gal/1,000 sq ft beginning when plants are dime-sized and continuing on a 5-7 day schedule. For damping off/stem rot, use enough volume to run down the stem.
Target spot	Quadris	azoxystrobin (11)	0.14 fl oz (4 ml)/1,000 sq ft	Only one application prior to transplanting. Use only if target spot begins to build.
Blue mold	Aliette WDG	fosetyl-Al (P07)	0.5 lb/50 gal	Apply 3-12 gal/1,000 sq ft. May cause leaf burn if washed into the root zone or float water when other products such as Admire or other Group 4A insecticides are used. Do not exceed 0.6 lb. product/1,000 sq ft/application or 1.2 lb product/1,000 sq ft/season.
Mosaic (tobacco mosaic virus)	whole or skim milk	milk (NA)	Hand dip: 1 pt in 1 gal dip water	Dip hands every 20 minutes while handling plants.
		milk (NA)	Plant spray: 5 gal/100 gal	Spray plants with milk solution 24 hours before handling.
Damping-off and Pythium root rot	Terramaster 4EC	etr Diazole (14)	<b>Preventive:</b> 0.7-1.0 fl oz/100 gal float water. Follow-up applications: 1.0 fl oz/100 gal <b>Curative:</b> 1.0-1.4 fl oz /100 gal float water when symptoms first appear. Follow up applications if symptoms recur: 1.0-1.4 fl oz/100 gal	Apply no sooner than 2 weeks (preventive rate) or 3 weeks (curative rate) after seeding. Additional applications can be made at 3-week intervals, up to 5 days before transplanting. No more than 3.8 fl oz/100 gal float water may be applied per crop. Even distribution in floatbed water is essential. Mix with water in a bucket to form a dilute emulsion, and distribute emulsion evenly into float bed water.
Damping-off and Pythium root rot	Oxidate 2.0	hydrogen dioxide + peroxyacetic acid (NA)	1.25-2.5 fl oz/10 gal (curative)	Approved for use in organic production. Curative: initial treatment of float bed water.
			6-24 fl oz/1000 gal (preventative)	Preventative: treat water on a regular basis or maintain a residual 100 ppm concentration (12.8 fl oz/1,000 gal).

\*Refer to product label for details on methods of application and restrictions.

## Disease Control Products for the Field

### A. Foliar Diseases

Disease	Product	Active ingredient (FRAC code)	Rate	Season Limit (per A)	PHI (days)	Remarks*
Angular leaf spot, wildfire, blue mold	streptomycin sulfate (Agri-Mycin 17, Harbour)	streptomycin sulfate (25)	8-16 oz/100 gal (100-200 ppm)	no limit	0	The low rate is for preventive action, the high rate for curative.
Blue mold	Actigard 50WG	acibenzolar-S-methyl (P01)	0.5 oz/A	1.5 oz	21	Begin applications after plants reach a height of 12 inches for dark tobacco, 18 inches for burley. Must be applied 4-5 days prior to infection to allow for activation of plant defense compounds. Apply on a preventative schedule when blue mold threatens. Other labeled fungicides may be applied for early-season control. Make up to three applications at 10-day intervals. Apply in at least 20 gal/A. Do not apply to plants that are stressed from drought, cold weather, excessive moisture or herbicide damage. Do not mix with foliar fertilizers or crop oils.
	Aliette WDG	fosetyl-AI (P07)	2.5-4.0 lbs/A	20 lbs	3	Begin with a minimum spray volume of 20 gal/A, increasing with each application to a maximum of 100 gal/A. Do not tank mix with copper compounds, surfactants or foliar fertilizers.
	Forum	dimethomorph (40)	2-8 fl oz/A	30 fl oz	0	Apply on 5-7 day schedule, beginning when blue mold threatens and continuing until weather becomes less favorable for disease. Increase rate and spray volume (20-100 gal/A) as crop size increases. Forum <b>must be tank mixed</b> with another effective blue mold fungicide (mancozeb) with a different mode of action. Ridomil Gold, Ultra Flourish, MetaStar, Revus and Actigard are not recommended as tank-mix partners for Forum. Do not mix with surfactants, foliar fertilizers, or sucker control materials.
	Manzate Pro-Stick	mancozeb (M03)	1.5-2 lbs/100 gal	no limit	30	Useful in resistance management programs for other fungicides. However, mancozeb residues on marketed leaf are undesirable, and use is prohibited by some contracts. Do not apply later than 7 weeks after transplanting to minimize the risk of high-residue levels.
	Quadris	azoxystrobin (11)	6-12 fl oz/A	32 fl oz	0	Begin applications before blue mold symptoms appear. Continue sprays on a 7-14 day schedule. If blue mold is present in the field, initiate applications with Forum plus mancozeb. Quadris must be alternated with a fungicide with a different mode of action. If blue mold is present, the alternation partner must have blue mold activity.
	Orondis Ultra A	oxathiapiprolin (49)	2.0-4.8 fl oz/A	19.2 fl oz	7	Use higher rates when disease is already present. Increase rate and spray volume (20-100 gal/A) as crop size increases. For resistance management, must be tank-mixed with ½ pt Revus; make no more than two sequential applications before rotating to a fungicide with a different mode of action, and do not use if Orondis Gold 200 was applied for black shank control.
	Presidio	fluopicolide (43)	4 fl oz/A	8 fl oz	7	Must be tank mixed with a blue mold fungicide with a different mode of action. All currently registered fungicides qualify. Begin applications before blue mold symptoms appear. Do not use if Presidio was previously applied for black shank control.

Disease	Product	Active ingredient (FRAC code)	Rate	Season Limit (per A)	PHI (days)	Remarks*
Blue mold	Revus	mandipropamid (40)	8 fl oz/A	32 fl oz	7	Begin applications before blue mold symptoms appear. Continue on a 7-10 day schedule. Make no more than two consecutive sprays before switching to a fungicide with a different mode of action (do not alternate with Forum). Addition of a surfactant may enhance activity.
Frogeye, Target spot	Quadris	azoxystrobin (11)	6-12 fl oz/A	32 fl oz	0	Must alternate with fungicides effective against the target disease. Can be used up to the day of harvest; however, the lack of effective rotation products that can be used after topping restricts the use of Quadris after topping to one application. Do not tank mix with EC- type insecticides or sucker control materials. Quadris enhances weather flecking on leaves, but this has not been a major problem.

\*Refer to product label for details on methods of application and restrictions.

## B. Black Shank

Fungicide	Active ingredient (FRAC code)	Season Rate/A	Pre-plant or at-planting applications			Post-plant applications	
			Method	Rate/A*	Remarks	Rate/A*	Remarks
Ridomil Gold SL	mefenoxam (4)	3 pt	Pre-plant only	1-2 pt	Apply to soil within 1 week before planting and incorporate into the top 2-4 inches of soil.	--	--
			Pre-plant + post-plant	1 pt	Apply to soil within 1 week before planting and incorporate into the top 2-4 inches of soil.	1 pt	Make first application as near as possible to transplanting if no pre-plant application was made or if black shank is expected early in the season. Otherwise, make application(s) at layby or at first cultivation and layby.
			Transplant water	¼-½ pt	Apply in no less than 200 gallons of transplant water per acre.	1 pt	Make subsequent application(s) at first cultivation and/or layby.
Ultra Flourish	mefenoxam (4)	6 pt	Pre-plant only	2-4 pt	Apply to soil within 1 week before planting and incorporate into the top 2-4 inches of soil.	--	--
			Pre-plant + post plant	2 pt	Apply to soil within 1 week before planting and incorporate into the top 2-4 inches of soil.	2 pt	Make first application as near as possible to transplanting if no pre-plant application was made or if black shank is expected early in the season. Otherwise, make application(s) at layby or at first cultivation and layby.
MetaStar 2E	metalaxyl (4)	12 pt	Pre-plant only	8-12 pt	Apply to soil just prior to planting and incorporate into the top 2-4 inches of soil.	--	--
			Pre-plant + post-plant	4 pt	Apply to soil just prior to planting and incorporate into the top 2-4 inches of soil.	4 pt	Do not make a post-plant application of MetaStar if more than 2 qt was used pre-plant or if none was used pre-plant. Post-plant application(s) may be made at layby or at first cultivation and layby.
Orondis Gold 200	oxathiapiprolin (49)	36.4 fl oz	Transplant water or post-plant	4-8 fl oz	Mix Orondis Gold 200 with 6-8 fl oz Ridomil. Rates up to 19.2 fl oz/A are labeled, such as in heavier soils. Apply in no less than 200 gallons of transplant water per acre.	4-8 fl oz	Mix Orondis Gold 200 with 6-8 fl oz Ridomil. Direct spray to the soil at first cultivation or layby. Rates up to 19.2 fl oz/A are labeled, such as in heavier soils. Do not use if Orondis Gold has already been applied.
Presidio	fluopicolide (43)	8 fl oz	--	--	--	4 fl oz	Make banded application directed at soil beneath leaves at first cultivation or layby.

\* Rate range of product. In general, use the highest labeled rates when disease pressure is high. Refer to product label for application information, restrictions and warnings.

**Table 1.** 2016 New and Selected\* Burley Tobacco Varieties — Relative Disease Resistance, Yield Scores and Maturity.

Variety	Black Shank		Virus Complex <sup>a</sup>	Black Root Rot <sup>a</sup>	TMV <sup>a</sup>	Fusarium Wilt	Relative Yield Score <sup>b</sup>	Maturity
	Race 0	Race 1						
ms KY 14 X L8LC	10	0	S	M	R	6	8	Early
KY 907LC	2	2	R	H	R	1	8	Med-Late
KT200LC	6	6	R	H	R	0	8	Late
KT204LC	7	7	R	H	R	1	9	Med-Late
KT206LC <sup>e</sup>	10	7	R	H	R	1	9	Med-Late
KT209LC	10	8	R	H	R	1	9	Med-Late
KT210LC	10	7	S	H	R	5	8	Late
KT212LC	10	4	S	H	R	5	8	Early
KT215LC	10	9	S	H	S	8	9	Late
NC BH 129LC	1	1	S	H	R	1	7	Med-Early
NC 3LC <sup>d</sup>	2	2	R	H	R	1	7	Med-Late
NC 7LC <sup>d</sup>	10	4	R	H	R	5	8	Late
NC 2000LC <sup>f</sup>	0	0	S	L	R	1	4	Late
NC 2002LC <sup>f</sup>	0	0	R	M	R	0	5	Medium
TN 86LC	4	4	R	H	S	0	6	Late
TN 90LC <sup>e</sup>	4	4	R	H	R	0	5	Medium
TN97LC	4	4	R	H	R	0	6	Med-Late
HYBRID 403LC	0	0	S	M	R	6	9	Medium
HYBRID 404LC	0	0	S <sup>c</sup>	H <sup>c</sup>	R <sup>c</sup>	4	9	Medium
HYBRID 501LC	5	5	S	H	R	4	5	Med-Early
N 126LC	0	0	S	M	R	3	8	Medium
N 777LC	2	2	S	M	S	0	3	Med-Late
N 7371LC	4	4	-	-	-	5	7	Late
NBH 98LC	2	2	S	M	R	3	5	Medium
HB04PLC	0	0	S	H	R	0	9	Med-Early
HB3307PLC	10	4	R <sup>c</sup>	H <sup>c</sup>	S	3	8	Late
HB4488PLC	10	4	-	-	-	3	9	Late
R 610LC	4	4	S	M	-	3	5	Medium
R 630LC	3	3	R	M	R	4	5	Early
R7-12LC	0	0	S	H	R	4	8	Late

\* For an extensive list of varieties visit: [uky.edu/Ag/Tobacco](http://uky.edu/Ag/Tobacco).

<sup>a</sup>R = highly resistant; M = medium resistance; S = susceptible. Dash (-) means that resistance level is unknown or not rated.

<sup>b</sup>Relative yield scores are based on growth under disease-free conditions.

<sup>c</sup>Based on a limited number of field tests and subject to change.

<sup>d</sup>Resistant to root knot nematode (*Meloidogyne incognita*, Races 1 and 3).

<sup>e</sup>Low resistance to blue mold (*Peronospora tabacina*).

<sup>f</sup>Medium resistance to blue mold (*Peronospora tabacina*).

**Table 2.** Characteristics of dark tobacco varieties.

Variety	Maturity	Black Shank (0-10) <sup>a</sup>		Use <sup>c</sup>	Relative Yield Score <sup>c</sup>	Relative Quality Score <sup>c</sup>	Black Root Rot <sup>d</sup>	TMV <sup>d</sup>	Wildfire <sup>d</sup>
		Race 0	Race 1						
NL Mad LC	Med-Late	0	0	F/A	7	9	S	S	S
TR Madole	Early-Med	0	0	F	6	6	S	S	S
Lit Crit	Med-Late	0	0	A/F	5	9	S	S	S
KY 160	Medium	0	0	A	3	9	S	R	S
KY 171 <sup>e</sup>	Medium	0	0	A/F	7	7	R	R	S
DF 911	Medium	0	0	F	8	6	R	R	R
VA 309	Early-Med	2	2	A/F	6	7	S	S	-
VA 359	Medium	1	1	A/F	6	7	S	S	-
TN D950	Early	3	3	F	8	6	R	R	R
KT D6LC	Early-Med	3	3	F	8	7	R	R	R
KT D8LC	Medium	4	4	F/A	9	5	S	S	S
KT D14LC	Medium	10	5	F/A	8	7	R	R	R
KT D17LC	Medium	10	6	F/A	9	7	R	S	R
DT 538LC	Medium	4	4	F/A	8	6	M	-	-
DT 558LC	Medium	4	4	F/A	8	7	M	S	-
PD 7302LC <sup>e</sup>	Medium	10	0	F/A	6	7	R	R	-
PD 7305LC	Early	10	3	F	8	6	R	R	R
PD 7309LC	Medium	10	0	F/A	7	8	S	S	-
PD 7312LC	Medium	0	0	A/F	7	8	R	R	S
PD 7318LC	Medium	10	0	F/A	8	7	R	R	-
PD 7319LC	Medium	10	2	F/A	8	7	-	R	-

<sup>a</sup>Black shank resistance levels are based on a limited number of field tests and subject to change.

<sup>b</sup>F or A refers to use as a fire-cured (F) or air-cured variety (A). Multiple letters indicates either use, with predominant use given first.

<sup>c</sup>Relative yield scores based on performance under disease-free conditions. Relative yield and quality scores given on a 0-10 scale, with 10 being best relative quality.

<sup>d</sup>R = highly resistant; M = medium resistance; S = susceptible. Dash (-) means that resistance level is unknown or not rated.

<sup>e</sup>KY 171, PD 7302LC and PD 7312LC have medium resistance to Fusarium wilt.

**Precautionary statement:** To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label.

**\*\*Disclaimer**

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication. Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product. The author(s), the University of Tennessee Institute of Agriculture and University of Tennessee Extension assume no liability resulting from the use of these recommendations.



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