



Plant Pathology Fact Sheet

2018 FUNGICIDE GUIDE FOR BURLEY AND DARK TOBACCO

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Modified from 2016 Fungicide Guide for Burley and Dark Tobacco and prior versions

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UPDATES TO TOBACCO FUNGICIDE LABELS IN 2018

The number of fungicides that are registered for use on tobacco in Kentucky is relatively small in comparison to the large array of products available to producers of other crops. No new active ingredients are available for disease management this year, but a number of options are marketed under new trade names by more companies. The following is a summary of recent changes to this guide:

- **NEW FOR 2018:** On the last page of this guide, an example of a **greenhouse disease management program** is outlined. While this program is not a one-size-fits-all solution, it has proven effective through multiple transplant production seasons and may be worth comparing to your existing program.
- Additions to this document are labeled compounds with **hydrogen peroxide, phosphites, or copper** as their active ingredients. There is relatively little efficacy data associated with these products, so their performance in tobacco is unknown.
- Several azoxystrobin fungicides are now labeled for target spot management in the greenhouse in KY, including **Aframe, AZteroid, Azoxyzone, and Satori**, in addition to fungal leaf spot management in the field. The active ingredient in these products is azoxystrobin, the same as the active in Quadris. See labels for any rate differences. Additional azoxystrobin products that go by other trade names are also labeled for field use.
- At the time of publication (April 2018), the supplemental label for Presidio on tobacco had not been updated yet, though it is expected to be renewed. **Prior to applying Presidio, confirm that a current label is in your possession, with an expiration date later than January 2018.**

The following tables list labeled chemicals that are available to growers in Kentucky for use in the production of burley and dark tobacco in 2018. As always, read all product labels carefully and follow all directions provided by the manufacturers. Each product has specific use directions that should be followed to minimize the risk of injury to the crop and applicator, and to maximize the effectiveness of the product. These tables are provided as a general set of guidelines to aid in product selection, but are not intended to replace product labels.

For additional information on diseases and recommendations for their control, refer to the 2017-2018 Multi-State Burley and Dark Tobacco Production Guide (ID-160). This publication can be obtained from Cooperative Extension offices around Kentucky or online at <http://www.ca.uky.edu/agc/pubs/id/id160/id160.pdf>.

Table 1. Guide to Chemicals Available for Control of Tobacco Diseases, 2018 – Transplant Float-bed Production

Product(s)	Product rate		Target diseases	REI ^b	Label notes
	Per application ^a	Per season			
Agri-mycin 17, Agri-Mycin 50, Harbour	0.5-1 lb/100 gal H ₂ O (1/3-1 tbs/gal)	no limit	Wildfire blue mold	12 hrs.	Apply 3-5 gal/1000 sq. ft. Preventative rate is 0.5 lb / 100 gal; curative rate is 1 lb/100 gal.
Aliette WDG	1 lb/100 gal H ₂ O (1 tbs/gal)	1.2 lb per 1000 sq. ft.	blue mold	12 hrs.	Apply 3 gal of solution per 1000 sq. ft. on small plants; increase to a maximum of 12 gal as plants grow. Do not tank-mix with copper compounds.
Manzate Pro-Stick (must have 24(c) label)	0.5 lb/100 gal H ₂ O (1 tsp./gal)	no limit	blue mold anthracnose damping-off target spot stem rot	24 hrs.	Apply 3-12 gallons/1000 sq. ft. as a fine spray. Begin when plants are dime-sized or larger, and continue on a 5-7 day schedule until transplanting.
Milk					
<i>Whole/Skim</i>	5 gal/100 gal H ₂ O (¾ cup/gal)	no limit	tobacco mosaic virus (plant- to-plant spread)	0 hrs.	Apply to plants at least 24 h prior to handling. Mix will treat 100 sq. yd.
<i>Dry</i>	5 lb/100 gal H ₂ O (5 tbs./gal)	no limit	tobacco mosaic virus (plant- to-plant spread)		For washing hands, add 1 pt of milk to 1 gal of water, dip hands every 20 minutes while handling plants.
Abrasive hand soap			tobacco mosaic virus (plant- to-plant spread)		Similar to dry milk, anyone handling transplants should regularly wash their hands with abrasive soaps to minimize spread of TMV.
Oxidate, Rendition	6-24 oz/1000 gal H ₂ O	no limit	Pythium blue mold	1 hr.	Apply preventatively to water and circulate well. Do not mix with copper compounds.
Quadris Flowable, Aframe, Azoxystrobin, Satori (must have supplemental label)	0.14 fl oz/5 gal H ₂ O (4 cc/5 gal)	1 application	target spot	4 hrs.	Apply once to plants before disease onset, around first or second clipping. Use 0.14 fl oz per 1000 sq. ft. of bed. Application counts toward seasonal limit in field.
FRAC group 11					
AZteroid	0.18 fl oz /5 gal H ₂ O	1 application	target spot	4 hrs.	Apply once to plants before disease onset, around first or second clipping. Use 0.18 fl oz per 1000 sq. ft. of bed. Application counts toward seasonal limit in field
FRAC group 11					
Terramaster 4EC	0.7-1.4 fl oz / 100 gal H ₂ O	3.8 fl oz	damping-off (<i>Pythium</i> sp.) root rot (<i>Pythium</i> sp.)	12 hrs.	Apply to floatbed water no earlier than 3 and no later than 8 weeks after seeding. Additional applications can be made at 3-week intervals. Use high rate for curative treatments; begin no sooner than 3 weeks after seeding. Do not apply later than 5 days before transplanting.

^aRate range of product. In general, use higher rates when disease pressure is high. Refer to product label for application information, restrictions, and warnings.

^bRestricted-entry interval.

Table 2. Guide to Chemicals Available for Control of Tobacco Diseases, 2018 – Soilborne Diseases (Field)

Product(s)	Product rate		Target diseases	Label notes
	Per application ^a	Per season		
Presidio (must have supplemental label) FRAC group 43 <i>1st cultivation or layby</i>	4 fl oz	12 fl oz	black shank	Two applications of Presidio can be made at either first cultivation or layby. Apply to soil beneath lower leaves; cultivate in immediately. Minimum 14 day treatment interval.
Orondis Gold 200 <i>transplant (setter) water</i> FRAC group 49	3.4 – 9.6 fl oz	9.6 fl oz.	black shank	May not be applied more than two times sequentially (recommendation is to apply once per season). 2(ee) label recommends tank mix of 3.4 – 4.8 fl oz Orondis Gold 200 mixed with 4 – 8 fl oz Orondis Gold B (Ridomil)
<i>pre-plant</i> OR <i>1st cultivation</i> OR <i>layby</i>	4.8 – 9.6 fl oz		black shank	Incorporate into soil after application.
Confine, Fosphite, K-phite, Phiticide, Phostrol, Rampart, FRAC group 33	See labels	No limit	black shank, Pythium in field	Use after transplanting. Do not tank-mix or use at high temperatures.
Ridomil Gold SL; Orondis Gold B ^b <i>transplant (setter) water</i> FRAC group 4 (must have 24(c) label)	4-8 fl oz (0.25 – 0.5 pt)	3 pt total	black shank	Recommended volume is 200 gal/A. Make at least 1 subsequent application at layby or 1 st cultivation. Ridomil Gold SL is the only group 4 fungicide approved for setter water.
<i>pre-plant only</i>	1-3 pt	3 pt	black shank damping off (<i>Pythium</i> sp.)	Incorporate into 2-4 inches of soil after application.
<i>pre-plant + layby</i> <i>pre-plant + 1st cultivation + layby</i>	1 pt + 1 pt 1 pt + 1 pt + 1 pt			
Ultra Flourish ^b FRAC group 4 <i>pre-plant only</i> <i>pre-plant + layby</i> <i>pre-plant + 1st cultivation + layby</i>	2-6 pt 2 pt + 2 pt 2 pt + 2 pt + 2 pt	6 pt	black shank damping off (<i>Pythium</i> sp.)	Incorporate into 2-4 inches of soil after application.
Meta Star 2EC FRAC group 4 <i>pre-plant only</i> <i>pre-plant + layby</i> <i>pre-plant + 1st cultivation + layby</i>	8-12 pt 4 pt + 4-8 pt 4 pt + 4 pt + 4 pt	12 pt	black shank	Incorporate into 2-4 inches of soil after application.

^aRate range of product **PER ACRE**. In general, use higher rates when disease pressure is high. Refer to product label for application information, restrictions, and warnings.

^bFirst application of Ridomil Gold can be made as late as 1st cultivation; for Ultra Flourish, the first application can be made up to a week after transplanting. Use of a variety with moderate ($\geq 4/10$) resistance to black shank is recommended when using this application schedule. If needed, a follow-up application of fungicide can be made at layby.

Table 3. Guide to Chemicals Available for Control of Tobacco Diseases, 2018 – Foliar Diseases (Field)

Chemical	Product rate		PHI ^b (days)	Target diseases	Label notes
	Per application ^a	Per season			
Agri-Mycin 17, Agri-Mycin 50, Harbour	100-200 ppm (4-8 oz/50 gal H ₂ O)	no limit	0	angular LS wildfire blue mold	Application may occur weekly. 200 ppm rate recommended in areas with a history of ALS.
Actigard 50WG	0.5 oz	1.5 oz (3 apps.)	21	blue mold	Begin applications when plants are >18 inches in height ^c . Make up to 3 applications on a 10-day schedule. Apply in a minimum of 20 gal/A.
Manzate Pro-Stick	1.5-2 lb/100 gal	no limit	30	blue mold target spot	Apply up to 100 gal/acre; discontinue sprays when blue mold threat no longer exists. Do not apply within 6 weeks of harvest.
FRAC group M3 (must have 24(c) label)					
Aliette WDG	2.5-4 lb	20 lb	3	blue mold	Make first application right after transplanting; continue on a 7-10 day schedule. Use a minimum spray volume of 20 gal/A; increase by 20 gal/A weekly to a maximum of 100 gal/A. Do not tank-mix with copper compounds.
FRAC group 33					
Orondis Ultra	2.0 – 4.8 fl oz	19.2 fl oz	7	blue mold	Apply as a foliar spray prior to blue mold disease onset. Ensure at least 7 days between applications. May not be applied more than two times sequentially before integrating a different mode of action.
FRAC group 49/40					
Quadris, Aframe, Azoxystar, Azoxyzone, Satori, Tetraban, Trevo, Willowood Azoxy2SC FRAC group 11	6.0 – 12.0 fl oz	32 fl oz	0	blue mold frog-eye LS target spot	Apply preventatively. Alternate applications with a different mode of action. Observe labeled rate limits.
Presidio	4 fl oz	12 fl oz	7	blue mold	Must be tank mixed with a labeled rate of another fungicide active against blue mold, but with a different mode of action. Apply as a foliar spray prior to disease onset or at first indication that blue mold is in the area. Make no more than 2 foliar applications per season with at least 7 days between applications.
As of April 2018, Presidio label not renewed for tobacco. CHECK FOR CURRENT LABEL BEFORE APPLYING TO CROP.					
FRAC group 43					

^aRate range of product **PER ACRE**. In general, use higher rates when disease pressure is high. Refer to product label for application information, restrictions, and warnings.

^bPre-harvest interval.

^cActigard can be applied to dark tobacco varieties at the 12-inch stage.

Table 4. Guide to Chemicals Available for Control of Tobacco Diseases, 2018 – copper products labeled for tobacco (relatively little efficacy data available)

Chemical	Product rate		REI ^b	Target diseases	Label notes
	Per application ^a	Per season			
Camelot O	0.5-2 gal ^c	50.8 gal	4 hrs	blue mold	Use on tobacco in transplant beds. Do not reapply within 10 days.
Group M					
Copper-Count-N	4-5 qts	90.1 qts	48 hrs ^d	angular LS	Apply at 10-day intervals when disease appears. Destroy all infected plants.
				frogeye LS	Apply just before transplanting and when topped.
				brown spot	Apply at 10-day intervals when disease appears.
	2 qts			blue mold wildfire	Apply at 10-day intervals from seeding to transplanting.
	5-6 qts			damping off	Avoid overwatering, apply once to the seed bed after planting.
Group M					
Cueva Fungicide Concentrate		50.8 gal	4 hrs	blue mold	Can be applied on transplant beds or in field grown plants. Minimum application interval of 10 days.
Group M					
Nordox 75 WG	2.5-3 lbs		12 hrs	angular LS	Apply every 7-10 days. Destroy all infected plants
Group M				brown spot frogeye LS	Apply every 7-10 days when disease appears.
	1.25 lbs			blue mold wildfire	Apply every 7-10 days when disease appears. Apply every 7 days from seeding to transplanting.
	3-4 lbs			damping off	Avoid overwatering, dust the seed bed after planting.
Phyton 27 AG	15-20 fl. oz/100 gal	8 lbs copper/A	48 hrs ^d	angular LS blue mold	Do not exceed 2 lbs of copper/A in single applications. Minimum application interval of 10 days.

^aRate range of product *PER ACRE*. In general, use higher rates when disease pressure is high. Refer to product label for application information, restrictions, and warnings.

^bRestricted-entry interval.

^cMixed in 30-100 gallons of water.

^dRestricted-entry interval of 24 hours for greenhouse applications.

Greenhouse disease management program outline

Timing	Product	Rate	Purpose
Dime-sized transplants	Mancozeb	1 tsp / gallon, Apply 3 gallons / 1000 sq ft	Target spot
Approx. 50% of cells with water roots	Terramaster	0.7 oz / 100 gal, circulated well	Pythium root rot
7 - 10 days after 1 st mancozeb app	Mancozeb	1 tsp / gallon, Apply 3 – 6 gallons / 1000 sq ft	Target spot, collar rot
Day after first clipping	Azoxystrobin (Quadris, Aframe, AZteroid, Satori, or Azoxyzone)	1 tsp Quadris, Aframe, Satori, or Azoxyzone / 1000 sq ft (1.3 tsp AZteroid / 1000 sq ft)	Target spot
7 – 10 days after azoxystrobin	Mancozeb	1 tsp / gallon, 3 – 6 gallons / 1000 sq ft	Target spot, collar rot
3 weeks after 1 st Terramaster treatment, or if roots develop obvious symptoms (not always necessary)	Terramaster	1.0 – 1.4 fl oz / 100 gal, circulated well	Pythium root rot
Every 7 – 10 days if holding plants	Mancozeb	1 tsp / gallon, 3 – 6 gallons / 1000 sq ft	Target spot, collar rot

NOTE:

For blackleg, a bacterial disease, streptomycin can be used to prevent disease development (100 ppm rate) or suppress spread of the disease once it is identified (200 ppm rate). In addition, N fertility should be moderate and steps should be taken to prevent high temperatures in the greenhouse.

Revised April 6, 2018