JUNE 12, 2020 | VOL. 2 ISS. 2

AG Talk Report

UNIVERSITY OF IDAHO, U.S. DEPARTMENT OF AGRICULTURE, AND IDAHO COUNTIES COOPERATING

INSIDE THE ISSUE

All 2020 Ag Talk Tuesday sessions will be on-line

Kasia Duellman, Pamela J.S. Hutchinson, and Juliet Marshall, 2020 Ag Talk Tuesday organizers

In 2020, the Ag Talk Tuesday sessions were moved to an on-line format. As of this writing, 91 people have registered, and this number will continue to rise as word of the series spreads. We look forward to being able to reach even more professionals in agriculture!

Join us on the first and third Tuesdays through August. Listen and contribute to crop updates and discussion on current season crop problems. Featured Topics presented by guest speakers follow the crop updates. Then, look for the Ag Talk Report newsletter to brush up on current-season issues including topics covered during Ag Talk Tuesday sessions.

Check the schedule online for the most current featured topics.

Ag Talk Tuesday Featured Topics 2020

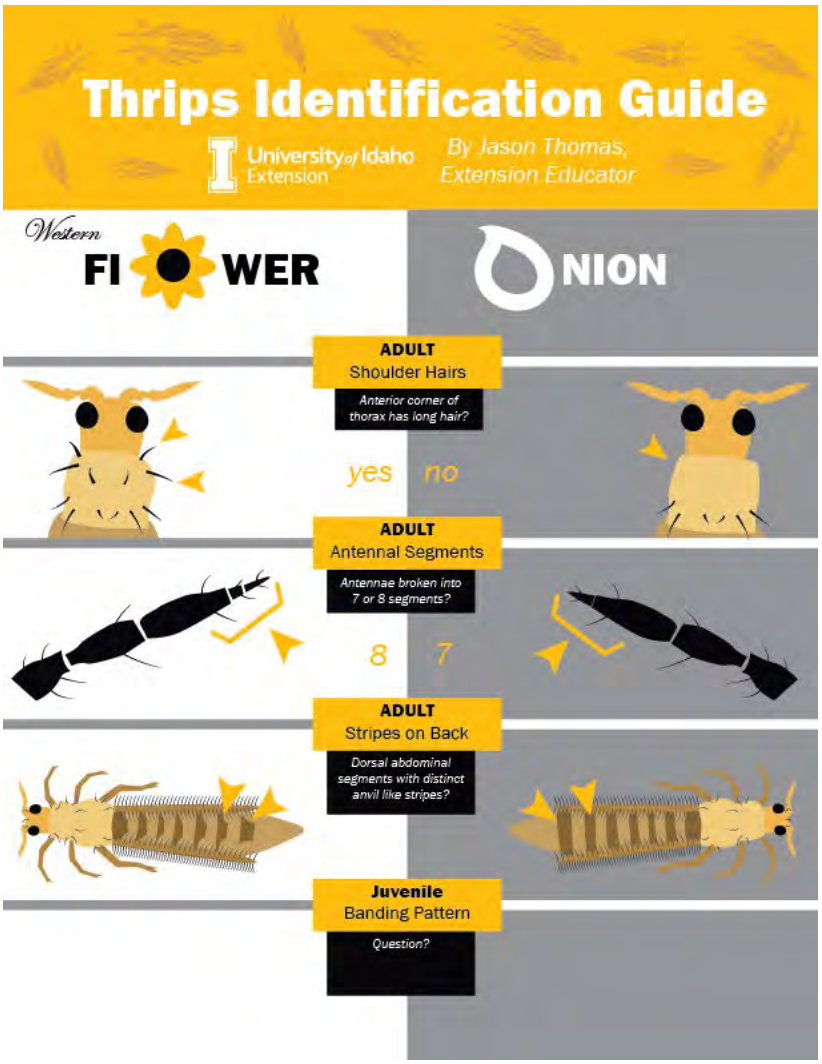
June 16	-Final fungicide recommendations for small grains and other hot topics -Using Teff grass as an emergency crop	Juliet Marshall Joseph Sagers
July 7	Field projects of cropping systems of alfalfa, quinoa, barley, and wheat	Xi Liang
July 21	Update by the Dean of UofI-CALS	Dean Michael Parrella
August 4	Economics/cost of production/ markets forecast	Ben Eborn
August 18	Starling management on dairies Soil Health Assessment	Jason Thomas Linda Schott

University of Idaho Extension

Thrips in Alfalfa

Reed Findlay, Extension Educator, Bingham and Bannock counties

Thrips insects are currently damaging Idaho alfalfa crops through their feeding. University of Idaho Extension Educators evaluated thrips population growth and associated damage to alfalfa crops during the 2019 growing season. Initially, small populations of both onion thrips and western flower thrips were found in alfalfa fields. Later in the season, large populations of western flower thrips were found in alfalfa. These later populations were associated with damage to the alfalfa crop. Adjacent small grains crops and rabbitbrush stands do not seem to be a source of thrips population build up prior to their movement into alfalfa fields.



Thrips are minute insects with feathery wings and piercing mouthparts. They migrate by catching a ride with the wind. Once they detect a desirable crop to feed on, they are capable of short directed flight and can land on leaf surfaces. Once on the leaf surface they use their mouthparts to puncture and lap up cell juices. This feeding can result in significant leaf cupping and discoloration (yellowing).

In recent years significant damage from thrips feeding has occurred on alfalfa crops in Southeastern Idaho. There are two thrips species that have been identified as the cause of this damage. They are the western flower thrips and the onion thrips. Western flower thrips are the most common thrips found. They have more hairs on their thorax and head and exhibit flared banding on the abdomen. The onion thrips are less common and have fewer and shorter hairs. They also have straight dark bands on the abdomen.

Thrips usually do not cause significant damage to alfalfa crops when present in low numbers. Their numbers can, however, increase rapidly due to their high reproductive capacity. Thrips can build their populations on other crops or rabbit brush in the area. Once these crops and plants reach maturity in the late summer they are less desirable to the thrips, and thrips populations then migrate to other green crops. Alfalfa remains in a green vegetative state in late summer and can attract large thrips populations as they migrate.

Cultural control methods for thrips include coordinating and synchronizing harvests to avoid thrips dispersion to non-harvested fields. Strip harvesting, which leaves uncut strips of alfalfa, could conserve beneficial and predacious insects. This may also concentrate thrips for chemical control measures. Chemical control measures for thrips can be found at: https://pnwhandbooks.org/insect.

In-Season Nutrient Management

Linda Schott, Nutrient and Waste Management Extension Specialist

Did you know that nutrient management is one practice that supports healthy soil? By only applying nutrients when the crop needs it, nutrient use efficiency increases. This means that the fertilizer that is applied, will be used by the crop and not lost to the environment. This not only reduces negative impacts to the environment but also benefits your pocketbook.

By only applying nutrients when the crop needs it or can use it, one of the 4 R's is followed. The 4 R's are: Right Source, Right Rate, Right Time, and Right Place (Figure 1). These all need to be considered and followed. The 4 R's are interrelated and connected.

Figure 1. 4 R's of nutrient stewardship (https://nutrientstewardship.org/4rs/).

In order to apply the **Right Rate**, the soil nutrient status should be known before fertilizer application by soil sampling. In general, it is best to soil sample in the spring. Consistency in soil sampling is key to ensure that results can be compared to previous years to establish trends. Fall soil sampling to deeper depths is highly recommended to evaluate whether the nutrients applied were used by the crop or simply leached deeper in the soil profile. More information on how to soil sample can be found in the University of Idaho Extension Bulletin 704 (https://www.extension.uidaho.edu/publishing/pdf/ext/ext0704.pdf). Only enough fertilizer to provide for crop needs should be applied.

Next, the nutrient source should be considered (**Right Source**). In general, nutrient sources should be tailored to the crop and the individual field. Thought should be given to what type of irrigation system is used and if the soil has a high pH or has a lot of calcium carbonate (free lime). These factors affect plant nutrient availability throughout the growing season.

In potato production, it is common to provide the crop with nutrients at the **Right Time**. Nutrients are 'spoon fed' throughout the growing season. Growers rely on petiole samples to determine fertilizer needs (Figure 2). While petiole samples can be used in sugarbeets, they aren't very helpful in making nutrient management decisions in the current crop year. They are very helpful in making decisions in future crop years. Split nutrient applications can also be used in a variety of other crops to improve nutrient use efficiency.

Fortunately, in Idaho, there are several methods to ensure that nutrients can be applied at the **Right Place** (and at the Right Time and Rate). Depending on the Source, fertilizer can be applied through the irrigation system, broadcast as a dry product, as a foliar spray, or with the seed at planting. Fertilizer placement should be customized for every crop, fertilizer source, and individual field to maximize fertilizer utilization.

By implementing the 4 R's and applying nutrient management practices used in crops like potatoes, soil health can be improved. Developing nutrient management plans for each field and crop will take time but is key to improving fertilizer utilization.

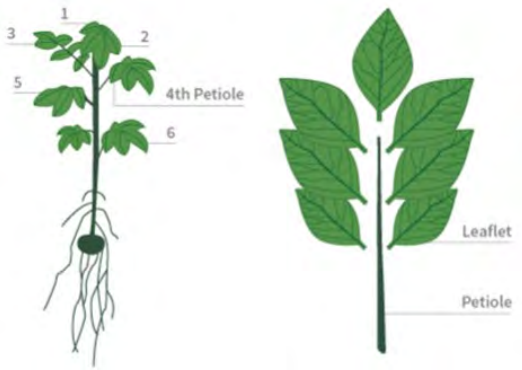


Figure 2. Petiole sampling in potatoes involves collecting 40-50 petiole samples per management zone or field every 7-10 days beginning 4 weeks after emergence until 3 weeks before vine kill. Consistency in sampling methods is very important. The fourth petiole from the top of the plant (shown above) should be sampled at the same time of day. Leaflets should be stripped immediately, and the petiole placed in a clean, clearly labeled container. If petioles cannot be submitted to the lab right away, they should be stored in cool conditions (<40F) or air dried until submission.

Cereals Update

Juliet Marshall, Cereals Agronomist and Plant Pathologist

Stripe rust on wheat. Photo by J. Marshalll

As of 3 June 2020, stripe rust has found its way to western Idaho, reported yesterday on UI Magic CL+. The growth stage of winter wheat in that area is past the window of fungicide application, and is currently in grain fill. Spring wheat is still vulnerable and susceptible varieties should be scouted for the appearance of stripe rust.

In the Magic Valley and into eastern Idaho, winter wheat is heading and susceptible varieties are still vulnerable to significant yield loss associated with stripe rust infection. Stripe rust reaction of last year's varieties in the Extension Variety Trials is reported in the 2019 Small Grains Report available online at https://www.uidaho.edu/extension/cereals/scseidaho. (The data is included here in Tables 1-4.)

Please note that while some varieties were reported as resistant in 2019, race changes were reported in California by Dr. Mark Lundy (UC Davis pathologist) in this year's crop; therefore scouting of all varieties is recommended this season. Please report observations so we can keep track of the in-season spread.

The weather forecast for this and especially next week is very conducive to stripe rust spread and infection. Fungicide application recommendations developed through NCERA-184 pathologists, coordinated by Dr. Erick De Wolfe Kansas State University, is also included here, Table 5.

Table 1. 2019 Disease Ratings in Aberdeen. Hard spring wheat under naturally occurring infection

Variety	Stripe Rust Infection Type (IT)	Percent Leaf Area Infected (PLAI) %	IT x PLAI	Stripe Rust Rating
12SB0224 (W)	0	0	0.0	R
Alum	0	0	0.0	R
Alzada (D)	6	1	0.1	R
AP Octane	0	0	0.0	R
AP Venom	6	5	0.3	MR
APRenegade	0	0	0.0	R
Cabernet	6	1	0.1	R
CP3066	0	0	0.0	R
Dayn (W)	0	0	0.0	R
Glee	0	0	0.0	R
IDO1603S	6	2	0.1	R
IDO1701S	0	0	0.0	R
IDO1702S	6	1	0.1	R
IDO1805S	0	0	0.0	R
Imperial (D)	3	5	0.2	R
Jefferson	7	30	2.1	S
Klasic (W)	6	30	1.8	S
Klasic (W) 1.2	6	30	1.8	S
Klasic (W) 1.4	6	30	1.8	S
SY Coho	6	10	0.6	MS
SY Gunsight	0	0	0.0	R
SY-Teton (W)	6	10	0.6	MS
UI Platinum (W)	5	20	1.0	S
WA8280 CL+	6	1	0.1	R
WB7202 CLP	0	0	0.0	R
WB7328 (W)	6	20	1.2	S
WB7589 (W)	6	1	0.1	R
WB7696	6	30	1.8	S
WB9411	0	0	0.0	R
WB9590	6	40	2.4	S
WB9668	0	0	0.0	R
WB9879CLP	7	30	2.1	S
Average	3.5	9.2	0.55	

(W) = White
(D) = Durum
(CLP) = 2-gene Clearfield

Table 2. 2019 Disease Ratings in Aberdeen. Soft white spring wheat under naturally occurring infection

Variety	Stripe Rust Infection Type (IT)	Percent Leaf Area Infected (PLAI)	IT x PLAI %	Stripe Rust Rating
Alturas	6	40	2.4	S
IDO1401S	6	60	3.6	VS
Louise	4	5	0.2	R
Melba	0	0	0.0	R
Ryan	6	2	0.1	R
Seahawk	0	0	0.0	R
SY Saltese	6	1	0.1	R
Tekoa	6	1	0.1	R
UI Cookie	4	40	1.6	S
UI Pettit	7	50	3.5	VS
UI Stone	6	40	2.4	S
WA 8297 CL+	0	0	0.0	R
WA 8303	0	0	0.0	R
WB 6121	0	0	0.0	R
WB 6430	0	0	0.0	R
WB-1035CL+	7	50	3.5	VS
Average	3.6	18.3	1.1	

Infecton Type: on a scale from 0 to 9, where 0 is immune, 1 is resistant, and 8 to 9 is very susceptible.

TIPS:

R to MR - should not need fungicides
MR - should not need fungicides unless disease pressure becomes high
MR to MS - consider spraying with protective fungicides under medium to high disease pressure
S = will need protective fungicide application when stripe rust is present
VS = will need fungicides in the presence of stripe rust, at times up to three applications in severe years Consider spraying at herbicide timing to prevent infection in S and VS varieties.

Table 3. 2019 Disease Ratings in Aberdeen. Hard winter wheat under naturally occurring infection

Variety	Stripe Rust Infection Type (IT)	Percent Leaf Area Infected (PLAI)	IT x PLAI %	Stripe Rust Rating
AP Nugrain (W)	6.0	40	2.40	S
Bobcat	0.0	0	0.00	R
FourOsix	6.0	1	0.06	R
Greenville	6.0	45	2.40	VS
IDO1506 (W)	6.0	20	1.20	S
IDO1607	6.0	70	4.20	VS
IDO1806 (W)	6.0	50	3.00	VS
Irv (W)	0.0	0	0.00	R
Keldin	6.0	40	2.40	S
Keldin + 11-52-0	6.0	40	2.40	S
LCS Jet	7.0	20	1.40	S
LCS Rocket	0.0	0	0.00	R
LCS Yeti (W)	7.0	20	1.40	S
LCS Zoom	0.0	0	0.00	R
Millie (W)	0.0	0	0.00	R
Norwest 553*	0/7	0/60	0/2.4	R/S
Ray	5.0	20	1.00	S
Scorpio	7.0	5	0.35	MR
Sequoia	7.0	60	4.20	VS
UI Bronze Jade (W)	7.0	50	3.50	VS
Utah 100	6.0	60	3.60	VS
WA8252 (W)	6.0	20	1.20	S
WA8289	6.0	30	1.80	S
WB4311	0.0	0	0.00	R
WB4623CLP	0.0	0	0.00	R
WB4792	6.0	40	2.40	S
Whetstone	7.0	70	4.90	VS
Yellowstone	6.0	40	2.40	S
Average	4.7	28	1.80	

* Mixture

(W) = White

Infection Type: on a scale from 0 to 9, where 0 is immune, 1 is resistant, and 8 to 9 is very susceptible.

TIPS:

R to MR - should not need fungicides
R to MR - should not need fungicides unless disease pressure becomes high
MR to MS - consider spraying with protective fungicides under medium to high disease pressure
S = will need protective fungicide application when stripe rust is present
VS = will need fungicides in the presence of stripe rust, at times up to three applications in severe years

Table 4. 2019 Disease Ratings in Aberdeen. Soft white winter wheat under naturally occurring infection

Variety	Stripe Rust Infection Type (IT)	Percent Leaf Area Infected (PLAI)	IT x PLAI %	Stripe Rust Rating
Appleby CL+	6.0	2	0.12	R
Brundage	8.0	80	6.40	VS
Bruneau	6.0	10	0.60	MS
IDO1708	7.0	1	0.07	MR
Jasper	7.0	1	0.07	MR
LCS Artdeco	0.0	0	0.00	R
LCS Blackjack	0.0	0	0.00	R
LCS Drive	0.0	0	0.00	R
LCS Ghost	6.0	1	0.06	R
LCS Hulk	0.0	0	0.00	R
LCS Shark	0.0	0	0.00	R
Nixon	0.0	0	0.00	R
Norwest Duet	0.0	0	0.00	R
Norwest Tandem	0.0	0	0.00	R
OR2X2CL+	0.0	0	0.00	R
Purl	6.0	2	0.12	R
Rosalyn	6.0	5	0.30	MR
Stephens	6.0	40	2.40	S
Stingray CL+	0.0	0	0.00	R
SY Ovation	8.0	10	0.80	MS
SY Assure	0.0	0	0.00	R
SY Raptor	0.0	0	0.00	R
UI Castle CL+	6.0	5	0.30	MR
UI Magic CL+	6.0	50	3.00	VS
UI Sparrow	7.0	50	3.50	VS
UIL 11-456031A	0.0	0	0.00	R
UIL 17-6268 (CL+)	6.0	1	0.06	R
UIL 17-6333 (CL+)	0.0	0	0.00	R
UIL 17-6546 (CL+)	0.0	0	0.00	R
UIL 17-6834 (CL+)	0.0	0	0.00	R
UIL15-72223	0.0	0	0.00	R
VI Bulldog	0.0	0	0.00	R
WB 456	6.0	10	0.60	MS
WB1376CLP	7.0	10	0.70	MS
WB1529	0.0	0	0.00	R
WB1783	7.0	2	0.14	MR
Average	3.1	8	0.53	

Table 5. Fungicides for control of wheat diseases.

Management of Small Grain Diseases

Fungicide Efficacy for Control of Wheat Diseases (2020 May 7, Final)

The North Central Regional Committee on Management of Small Grain Diseases (NCERA-184) has developed the following information on fungicide efficacy for control of certain foliar diseases of wheat for use by the grain production industry in the U.S. Efficacy ratings for each fungicide listed in the table were determined by field testing the materials over multiple years and locations by the members of the committee. Efficacy is based on proper application timing to achieve optimum effectiveness of the fungicide as determined by labeled instructions and overall level of disease in the field at the time of application. Differences in efficacy among fungicide products were determined by direct comparisons among products in field tests and are based on a single application of the labeled rate as listed in the table. Table includes most widely marketed products, and is not intended to be a list of all labeled products.

Efficacy of fungicides for wheat disease control based on appropriate application timing

Fungicide(s)												
Class	Active Ingredient	Product	Rate/A (fl. oz)	Powdery mildew	Stagonospora leaf/glume blotch	Septoria leaf blotch	Tan spot	Stripe rust	Leaf rust	Stem rust	Head scab[4]	Harvest Restriction
Strobilurin	Picoxystrobin 22.5%	Aproach SC	6.0 – 12.0	G[1]	VG	VG[2]	VG	E[3]	VG	VG	NL	Feekes 10.5
	Pyraclostrobin 23.6%	Headline SC	6.0 - 9.0	G	VG	VG[2]	E	E[3]	E	G	NL	Feekes 10.5
Triazole	Metconazole 8.6%	Caramba 0.75 SL	10.0 - 17.0	VG	VG	--	VG	E	E	E	G	30 days
	Tebuconazole 38.7%	Folicur 3.6 F[5]	4.0	NL	NL	NL	NL	E	E	E	F	30 days
	Prothioconazole 41%	Proline 480 SC	5.0 - 5.7	--	VG	VG	VG	VG	VG	VG	G	30 days
	Prothioconazole19% Tebuconazole 19%	Prosaro 421 SC	6.5 - 8.2	G	VG	VG	VG	E	E	E	G	30 days
	Propiconazole 41.8%	Tilt 3.6 EC[5]	4.0	VG	VG	VG	VG	VG	VG	VG	P	Feekes 10.5.4
Mixed modes of action[6]	Tebuconazole 22.6% Trifloxystrobin 22.6%	Absolute Maxx SC	5.0	G	VG	VG	VG	VG	E	VG	NL	35 days
	Cyproconazole 7.17% Picoxystrobin 17.94%	Aproach Prima SC	3.4 - 6.8	VG	VG	VG	VG	E	VG	--	NR	45 days
	Prothioconazole 16.0% Trifloxystrobin 13.7%	Delaro 325 SC	8.0	G	VG	VG	VG	VG	VG	VG	NL	Feekes 10.5 35 days
	Pydiflumetofen 13.7% Propiconazole 11.4%	Miravis Ace SE	13.7	VG	VG	VG	VG	VG	VG	VG	G[7]	Feekes 10.5.4
	Fluxapyroxad 2.8% Pyraclostrobin 18.7% Propiconazole 11.7%	Nexicor EC	7.0 - 13.0	VG	VG	E	E	E	E	VG	NL	Feekes 10.5
	Fluoxastrobin 14.8% Flutriafol 19.3%	Preemptor SC	4.0 - 6.0	--	--	VG	VG	E	VG	--	NL	Feekes 10.5 and 40 days
	Fluxapyroxad 14.3% Pyraclostrobin 28.6%	Priaxor	4.0 - 8.0	G	VG	VG	E	VG	VG	G	NL	Feekes 10.5
	Propiconazole 11.7% Azoxystrobin 13.5%	Quilt Xcel 2.2 SE[5]	10.5 - 14.0	VG	VG	VG	VG	E	E	VG	NL	Feekes 10.5.4
	Prothioconazole 10.8% Trifloxystrobin 32.3%	Stratego YLD	4.0	G	VG	VG	VG	VG	VG	VG	NL	Feekes 10.5 35 days
	Benzovindiflupyr 2.9% Propiconazole 11.9% Azoxystrobin 10.5%	Trivapro SE	9.4 - 13.7	VG	VG	VG	VG	E	E	VG	NL	Feekes 10.5.4
	Flutriafol 18.63% Azoxystrobin 25.30%	Topguard EQ	4.0-7.0	VG	NL	VG	VG	E	E	VG	NL	Feekes 10.5.4 30 days

[1] *Efficacy categories: NL=Not Labeled; NR=Not Recommended; P=Poor; F=Fair; G=Good; VG=Very Good; E=Excellent; -- = Insufficient data to make statement about efficacy of this product.*

[2] *Product efficacy may be reduced in areas with fungal populations that are resistant to strobilurin fungicides.*

Late Blight Recommendations for 2020

Phill Wharton, Potato Pathologist

Information on in-season late blight risk can be found at the recently developed website https://cropalerts.org/ , which serves as a repository for crop disease monitoring data (such as from the University of Idaho spore trap network, a University of Idaho and industry partnership) and various weather stations from across the state.

Late blight risk for 2020 in southern Idaho remains high, primarily due to presence of the disease in south central Idaho in 2019 and the fact that our mild winter has allowed numerous volunteer potatoes to emerge. For more information on current late blight recommendations, please visit https://bit.ly/2ZqUwVq or continue reading below.

Effective management of late blight requires the implementation of an integrated disease management approach, including strict sanitation practices (e.g. management of cull piles), good irrigation management, cultural practices and the proper timing and application of effective fungicides. All these practices together can reduce the chances of a late blight outbreak. Cultural practices are the first line of defense against late blight. Before planting growers should take several measures to control late blight.

Firstly, it is important to eliminate potential sources of inoculum. These are likely to be infected potatoes in cull piles, infected volunteer potato plants that survived the winter and infected seed tubers. For information on volunteer and cull potato management see the Potato Progress XVI (4) article (http://bit.ly/1XSWHsS). Field scouting should begin after emergence when the first plants are 4 to 6 inches tall. Field scouting should be a vital component of a grower's IPM program. Scouting allows growers to make informed disease and pest management decisions and provides early detection of other problems that may be present in the field, such as nutrient deficiency or herbicide injury. By using information collected by scouts, growers can time fungicide applications for optimal effectiveness. This is especially important for the control of late blight as fungicides are most effective when applied to foliage before infection occurs or when the disease is in its very earliest stages of development and no symptoms are visible. In the irrigated fields of southern Idaho, late blight can be very difficult to manage once infections become established as the humid microclimate within the canopy favors further disease development after irrigation.

There are a wide range of fungicides labeled for use against potato late blight (Table 1). Each fungicide is different and will have specific conditions for use listed on the label with additional details regarding application rates, re-entry intervals and total product amounts that can be applied in a season. Some may even include information on how to minimize the risk of fungicide resistance developing. Fungicides that are effective for the control of late blight tend to have one of three modes of action: germination inhibition (they prevent germination of spores and thus plant infection), inhibiting mycelial growth (they block pathogen colonization of the plant cells), anti-sporulation activity (they prevent the pathogen from sporulating and thus limit spread of the disease).

Recommended programs for late blight control are not straightforward. The product(s) of choice will depend on whether the crop is at low risk, high risk or already has some disease and from where the disease has developed. The appropriate placement of translaminar and other systemic products in a fungicide spray program should be determined by the mode of action of the product in relation to the host and disease development.

However, all products are best used within a preventative protectant program. For example, Previcur Flex, Forum, Revus, Curzate, Reason, and Gem (all plus protectant fungicide [EBDC or chlorothalonil]), or Gavel or Tanos may be applied while the canopy is expanding but before senescence. Forum is most effective during canopy expansion and as a post-senescence product and can be applied up to late crop senescence.

Results from fungicide resistance screening of *P. infestans* isolates (US23) collected in the 2019 growing season indicated that the US23 strain in Idaho had developed resistance to mefenoxam. As such, Ridomil Gold SL and other

Table 1. Common potato fungicides registered for control of late blight in Idaho. This list does not include seed or in-furrow treatments and is not comprehensive.

Product name (rate /A)	Active Ingredient(s)	PHI	REI	FRAC	Comments
Agri Tin, Super Tin 4L, Super Tin 80WP (2.5 – 3.75 oz)	triphenyltin hydroxide	7 days	48 hrs	30	Restricted use pesticide. A 1.87 oz/a rate can be used when tank mixed with another fungicide
Bravo WeatherStik, Echo 720, Equus 720 (1 – 1.5 pt) Bravo Ultrex (0.9 – 1.36 lb) Echo Zn (1	chlorothalonil	7 days	12 hrs	M5	Do not apply more than 11.25 lbs a.i. per season.
Cabrio Plus (2.9 lb)	pyraclostrobin + metiram	3 days	24 hrs	11+M3	No more than 17.4 lb/a per season. Do not apply more than 2 sequential applications.
Curzate 60DF (3.2 oz foliar)	cymoxanil	14 days	12 hrs	27	Locally systemic. Must be tank mixed with a protectant fungicide.
Dithane F45 Rainshield (0.4 – 1.6 qt) Dithane M45 (0.5 – 2 lb) Penncozeb 80WP, Penncozeb 75DF (0.5 – 2 lb) Penncozeb 4FL, Manzate Flowable (0.4 – 1.6 qt) Manzate Pro-Stick (1 to 2lb)	mancozeb	14 days	3 days	M3	Maximum rate per season is 11.2 lb a.i.
Evito 480 SC (3.8 fl oz)	fluxastrobin	7 days	12 hrs	11	Maximum rate per season is 0.72 lbs a.i. No more than 6 applications per season.
Forum (4 – 6 oz)	dimethomorph	4 days	12 hrs	40	Do not exceed 30 oz/ season. Must tank mix with other fungicide.
Gavel 75DF (1.5 – 2 lb)	zoxamide + mancozeb	14 days	48 hrs	22 + M3	Do not apply more than 6 applications or 12 lb/a.
Gem 500SC (3.8 fl oz)	trifloxystrobin	7 days	12 hrs	11	Do not exceed 23 fl oz/a per season. Always mix with a ¾ rate of protectant when targeting late blight.
Headline (6 to 12 fl oz)	pyraclostrobin	3 days	12 hrs	11	Do not exceed 72 fl oz/a per season.
Omega 500F (5.5 fl oz)	fluazinam	14 days	48 hrs	29	Do not exceed 3.5 pts/a per season.

Table 1, continued.

Omega Top MP (5.5 fl oz) co-pack label sold with Top MP	fluazinam	14 days	48 hrs	29	Do not exceed 3.5 pts/a per season.
Oronidis Ultra (5.5 – 8.0 fl oz)	Oxathiapiprolin + mandipropamid	14 days	4 hrs	U15 + 40	Max single application rate is 8.0 fl oz/A. Max annual rate is 32.0 fl oz/A/year. Do not apply >0.125 lb ai/year of oxathiapiprolin. Do not apply >0.522 lb ai/year of mandipropamid. Make no more than 2 sequential applications before rotating to a different mode of action. Do not follow soil applications of oxathiapiprolin with foliar applications of Orondis Ultra.
Oronidis Opti (1.75 – 2.5 pt)	Oxathiapiprolin + chlorothalonil	7 days	12 hrs	U15 + M5	Max single application rate is 2.5 pt/A. Max application annual rate is 10 pt/A/year. Do not apply >0.125 lb ai/A/year of oxathiapiprolin. Donotapply >11.25lb ai/A/year of chlorothalonil.
Polyram 80DF (1.5 – 2 lb)	metiram	3 days	24 hrs	M3	Do not apply more than 14 lbs per season
Previcur Flex (0.7 – 1.2 pts)	propamocarb hydrochloride	14 days	12 hrs	F	Must tank mix with another fungicide. Do not exceed 6 pts/a per season. Always tank mix with low rate of protectant.
Priaxor (4 – 8 fl oz)	fluxapyroxad + pyraclostrobin	7 days	12 hrs	7+11	Do not apply more than 24 fl oz/a per season. Labeled for suppression of late blight only.
Quadris (6 to 15.5 fl oz)	azoxystrobin	14 days	4 hrs	11	Do not apply more than 2 lb a.i./a per season. Always tank mix with a protectant
Quadris Opti (1.6 pts)	azoxystrobin + chlorothalonil	14 days	12 hrs	11+M5	Alternate with non Group 11 fungicides to manage resistance
Ranman (1.4 to 2.75 fl oz)	cyazofamid	7 days	12 hrs	21	Follow label for resistance management
Reason (5.5 to 8.2 fl oz)	fenamidione	14 days	12 hrs	11	Do not exceed 24.6 fl oz per season
Revus Top(5.5 to 8 fl oz)	mandipropamid + difenoconazole	14 days	12 hrs	40+3	Do not exceed 28 fl oz/a per season. Use of an adjuvant is recommended.
Tanos (8 to 10 oz)	cymoxanil + famoxadone	14 days	12 hrs	27+11	Alternate with non Group 11 fungicides to manage resistance

Table 1, continued.

Zampro (11 – 14 fl oz)	ametoctradin + dimethomorph	4 days	12 hrs	45+40	Do not make more than 2 sequential applications. Follow label for resistance management.
Zing! (32 -34 fl oz)	zoxamide + chlorothalonil	7 days	12 hrs	22+M5	Do not make more than 2 sequential applications. No more than 8 applications per season.

Note: Results from fungicide resistance screening of *P. infestans* isolates (US23) collected late in the 2019 growing season indicated that the US23 strain in Idaho had developed resistance to mefenoxam. Ridomil Gold, Ridomil Gold SL and other products containing mefenoxam should **NOT** be used to control late blight in Idaho in the 2020 growing season until we have collected and tested enough *P. infestans* isolates to determine whether isolates involved in any 2020 are resistant or sensitive to mefenoxam. Based a table by A.J. Gevens, University of Wisconsin.

products containing mefenoxam only, may not be effective in the control late blight in Idaho in the 2020 growing season. Their use is not recommended for late blight control until we have collected and tested enough *P. infestans* isolates to determine whether isolates involved in any 2020 outbreak are resistant or sensitive to mefenoxam.

If isolates of the late blight pathogen are sensitive, then mefenoxam-based products will be an effective tool. Ridomil has been shown to have curative properties and may halt a late blight epidemic if it is applied early enough in an outbreak (less than 1% field infection). If you are using mefenoxam based products in a program for control of pink rot and pythium leak, you should continue to do that as there are no know issues with resistance in these pathogens in Idaho. Table 2 shows suggestions for late blight control using protectant, systemic and semi-systemic fungicides under different late blight risk conditions prior to any reported late blight outbreak. For more information on a mid – late season spray program to manage late blight click here (http://bit.ly/1KWFt6a).

Table 2. Suggestions for late blight control using protectant, systemic and semi-systemic fungicides under different late blight risk conditions in susceptible potato varieties, assuming that late blight has not been found in

Application timing	Low risk[a]	Medium Risk[b]	High Risk[*]
When plants are at 50% emergence	none	[†]Protectant only	Revus Top, Tanos, Forum, Previcur Flex, Orondis Opti (or similar systemic) + protectant
Row closure	lowest labeled rate of protectant fungicide or fungicide program targeting early blight/ white mold. e.g Luna Tranquility, Endura, Quadris Top etc.	Highest labeled rate of protectant fungicide or systemic fungicide with dual activity against late blight and early blight/ white mold. e.g. Revus Top, Omega, Quadris Top, Tanos, Gavel.	Curzate, Tanos, Forum, Previcur Flex (or similar systemic) + protectant
7 days after row closure	none	none	highest labeled rate of protectant. every 7 days until row closure
14 days after row closure	Lowest labeled rate of protectant fungicide or continue early blight / white mold program	Highest labeled rate of protectant, or continue early blight /program.	
Late season (close to vine kill)	Gavel or Zing! or protectant + Super Tin	Gavel or Zing! or protectant + Super Tin	Gavel or Zing! or protectant + Super Tin

[a] With the absence of late blight in south eastern Idaho in 2019, it could be considered at low risk in 2020.
[b] With the limited out breaks of late blight in the Magic Valley in 2019, the area could be considered at high risk in 2020.
[†] Protectant = EBDC (e.g. Dithane or Penncozeb etc) or Chlorothalonil (Bravo, Echo etc)
[*] If weather conditions become particularly conducive to a late blight outbreak (persistent cool, wet weather), or late blight is found in the county then the program may need to be changed to a 5 day spray schedule with a systemic fungicide alternating with a protectant. For more information on a mid – late season spray program to manage late blight see http://bit.ly/1KWFt6a.
[‡] **DISCLAIMER:** References to commercial products or trade names on this page are provided as a convenience only and do not imply endorsement by the University of Idaho or bias against those not mentioned.

Volunteer potato control recommendations for 2020—Update

Pamela J.S. Hutchinson, Potato Cropping Systems Weed Scientist, University of Idaho Aberdeen R&E Center.

Volunteer potatoes can grow from tubers left in the field after harvest the prior fall. Even if fall tillage buries these tubers, temperatures low enough to render them non-viable, 25 F in dry soil, may not occur deep enough in the soil profile aka "Kill Zone"… *surprising for Idaho Washington, and Oregon*! In addition, snow cover may even prevent freezing of the soil surface.

Timing:

• ***Optimum postemergence herbicide application time to volunteer potato is at tuber initiation*** (tuber initiation is when the tip of the stolon (underground stem) starts to swell to form a new potato tuber).

NOTE: Volunteer potato tuber initiation may have already started in your area, however, the recommendations below might still kill the plants and possibly prevent tuber maturity. Read and follow the labels.

An excellent article about a Michigan State University volunteer potato control study in corn was recently published in Potato Grower:

"Options for Controlling Volunteer Potatoes." Potato Grower Published online: Apr 02, 2020 by Erin Burns & Chris Long.

https://www.potatogrower.com/2020/04/options-for-controlling-volunteer-potatoes

Source: Michigan State University Extension

https://www.canr.msu.edu/news/options-for-controlling-volunteer-potatoes

From the article/study results and regardless of treatment used "…as the size of volunteer potatoes increased, control decreased. When applications were made to small volunteers (less than 6 inches), 60% of treatments resulted in one or no daughter tubers produced per plant. When applications were made to medium (6-12 inches) or tall (more than 12 inches), only 25% and 0% of treatments resulted in one or no daughter tubers produced per plant**."**

Preventative measures can go a long way for avoiding the problem in the first place. *However, right now the issue is killing the volunteer potatoes already in the field*.

The two photos (right) are of volunteer potatoes in a sugar beet field. The tuber remaining after the prior year potato harvest is only golf ball size but has produced a healthy 6 inch tall plant. Tuber initiation has started (circled in the 2nd photo), therefore, if not killed ASAP, this plant will produce tubers that can result in volunteer potatoes the following season or beyond.

New sprouts/plants can emerge after herbicide application(s), so monitor fields closely after application in order to continue an effective control strategy.

Volunteer potato control methods for spring/ early summer 2020:

- Herbicide application.
- Cultivation.
  - ◊ Repeated cultivations and hand weeding can control volunteer potatoes, but are most effective and economical when combined with other control methods.
  - ◊ Two or more cultivations are required to reduce volunteer potato tuber production by more than 50% but cultivation does not control potatoes in the crop row.

- ◊ Research has shown that cultivating four times during the season beginning when volunteer potatoes were at the 6 to 8 leaf stage and hooking, and repeating each time potatoes regrew to this stage, reduced potato competitiveness and nearly eliminated production of new tubers.
- Combination of herbicide and cultivation (examples are given below).

A healthy crop is more competitive than a crop with nutrient, water, pest, etc. issues.

Goal:

- Kill emerged volunteer potato plants.
- Prevent volunteer potatoes from re-sprouting.
  - ◊ Volunteer potatoes have a large carbohydrate reserve in the tuber and can re-sprout even after the foliage has been destroyed.
- Prevent the volunteer plant (**mother**) from producing new tubers (**daughter tubers**) which can become a problem in next year's crop.
- Reduce weight of daughter tubers if they are already being produced by control time.
- Depending upon the herbicide used, possible translocation to the tuber just being initiated which is a sink for photosynthates, and hence, a chance for the herbicide to also go to the daughter tuber and kill = no longer can sprout.
- If the herbicide application occurs earlier than tuber initiation, then the original volunteer potato tuber (**mother tuber**) may re-sprout.
- Herbicide application later than tuber initiation is usually too late because daughter tubers which have already formed by spraying time can survive and produce volunteer potato plants in the following year's crop.
- If volunteer potato plants are sprayed too late, in addition to competition which has already occurred, the mother plant with the developing daughter tubers is competing with the crop for water and nutrients even more now than before daughter tuber production began.
  - ◊ University of Idaho research results: when glyphosate application did not occur until after daughter tubers were developing, the potato plant was killed, however, sugar beet yields were reduced due to the extended competition.
  - ◊ According to Oregon State University researchers, delayed control measures in onion can also affect yield, especially since the potato plant canopy will shade over the onions.

Herbicides:

This herbicide list is not complete. Herbicides listed for use in some crops may also be labeled for use in other crops. Most labels state "suppression" not control of volunteer potatoes. Rates are not always given for herbicides listed.

Unless noted, application timing is postemergence (after the volunteer potato has emerged).

Read and follow labels closely for labeled crops, proper rates, timing of applications, crop growth stage, adjuvant recommendations, and crop rotation restrictions.

Trade names are used to simplify information – no endorsement of discrimination is intended.

General herbicide information:

- Sulfonylureas, such as Harmony, can injure volunteer potato vegetation but usually aren't effective at preventing re-sprouting and daughter tuber production.
- *Repeated* applications of contact (burndown) herbicides such as, oxyfluorfen (Goal), carfentrazone (Aim), fomesafen (Reflex), glufosinate (Rely), or paraquat (Gramoxone) can be effective at killing the plant above-ground, however, the mother tuber could keep re-sprouting.
- Cultivation 7 to 10 days after postemergence applications of Starane (fluroxypyr), oxyfluorfen (Goal and others), glyphosate (Roundup and others), and/or dicamba (Banvel, Clarity, and others) has been shown to significantly reduce the number of tubers (daughter tubers) produced by the volunteer potato plant (mother plant) compared to herbicides alone.

- Some crops have labels for use of burndown herbicides such as paraquat, carfentrazone (Aim), or glyphosate (Roundup and others) after planting but before crop emergence.
  - ◊ If the volunteer potatoes have not reached the tuber initiation stage, then control measures at this time most likely will not be effective.
- There are pre-mix products (more than one herbicide in the container) which might be labeled for volunteer potato control.

A partial list of the 82 herbicides shown on the Idaho State Department of Agriculture website labeled for control of volunteer potatoes is shown below.

https://www.kellysolutions.com/ID/showproductsbypest.asp?Pest_ID=PEWAIBL01

Idaho State Department of Agriculture: Partial list of the 82 herbicides that are	
ACURON HERBICIDE	HARNESS MAX HERBICIDE
CALLISTO GT	LAUDIS HERBICIDE
CALLISTO HERBICIDE	MESOTRIONE 4SC
CALLISTO XTRA	NORTRON SC HERBICIDE
DIFLEXX DUO	STALWART 2W
DISTINCT HERBICIDE	STARANE ULTRA
DREXEL MESOTRYONE 4L	STATUS HERBICIDE
ETHOFUMESATE 4SC	WIDEMATCH

Roundup Ready Crops

Glyphosate (Roundup) is an option. As mentioned, the most effective application time is when the volunteer potato plant is at the tuber initiation phase.

Corn

Roundup (glyphosate) in Roundup Ready corn – most effective if applied when volunteer potatoes are at the tuber initiation stage.

Callisto 4 SC (mesotrione) can effectively reduce daughter tuber formation at 2 to 3 fl oz/A (with 1 % v/v crop oil concentrate + UAN (32% N) at 2.5% v/v). AMS (ammonium sulfate) can be substituted for the UAN.

• Cultivation after Callisto application may not improve volunteer potato control.

Atrazine (Aatrex, Atrazine, and others). Various rates and adjuvants – see labels.

Laudis (tembotrione) apply 3 fl oz/A with appropriate adjuvants to volunteer potato <6 in tall. Can be tank mixed with atrazine (a minimum of 0.5 lb ai/ A) for use in corn.

Excerpt from Figure 3 of the aforementioned Potato Grower article and Michigan State University Extension website:
"Volunteer potato control 30 days after application…E = Laudis, F= Laudis + Atrazine…" Photos by Erin Burns, MSU.
Within a picture from left to right: application was made to 6 in, 6-12 in, or >12 in volunteer potatoes.

Laudis 3 fl oz/A **Laudis + atrazine** (0.5 lb ai/A)
werer
NOTE: Both treatments were applied with 1% MSO + 8.5 lb/100 gal AMS

Impact or Armezon (topramezone): There are reports that a combination of topramezone (Impact or Armezon) at 1 oz (as per a supplemental label) and atrazine + 1% v/v MSO.

Aim 2 EC (carfentrazone-ethyl) one application alone (0.5 fl oz/A) can kill exposed foliage of potato, but new shoots continued to emerge and reduced corn yield; Aim 2 EC 0.5 fl oz/A two or three times applied one week apart is more effective than a single application.

Aim 2 EC + dicamba (Banvel, Clarity, or others) (0.5 fl oz + 8 fl oz/A) in a single application at tuber initiation.

Starane 2/3 pt/A (a second application may be needed – do not exceed 1.33 pt/A per year)

NOTE: the Starane ULTRA label states 0.4 pt/A.

Status (diflufenzopyr + dicamba) is a more recently released product than Distinct and includes a safener. The use rate is 2.5 to 10 fl oz/A. Research has shown that 6 fl oz/A early postemergence + 0.4 fl oz/A mid- or late-postemergence (do not exceed 10 fl oz/A per year) may suppress or control volunteer potato in corn.

DiFLexx is a formulation of dicamba with improved safety to corn over some previous dicamba formulations. It can be applied preplant, preemergence, postemergence, and/or as a directed spray. Adjuvant combinations recommended for postemergence applications are crop oil concentrate (COC) or methylated seed oil (MSO) at 1% v/v plus 2 to 4 quarts/A of UAN or AMS at 8.5 to 17 lb/100 gal spray mix.

DiFlexx at 8 to 12 fl oz/A + Roundup (in Roundup Ready Corn) at the appropriate rate and with MSO and UAN as described above, can be effective.

READ AND FOLLOW THE MOST UP-TO-DATE LABELS.

Small grains

Starane Ultra (fluroxypyr) 0.7 pt/A. The label states that application(s) should be made before volunteer potatoes are 8 inches tall.

Aim 2 EC (see corn recommendations)

2,4-D + dicamba: not very effective unless used in a competitive, healthy (wheat) crop. Barley is sensitive to dicamba so it is not recommended for use in this crop.

Roundup pre-harvest would most likely be too late to prevent daughter tuber production, however, translocation to the daughter tuber during bulking phase could prevent daughter tubers from sprouting the following year (ala glyphosate drift onto a seed potato crop).

Sugar beet

Roundup in Roundup Ready sugar beet. Most effective application timing is when volunteer potatoes are at the tuber initiation stage.

Nortron (ethofumesate): A preemergence application can slow volunteer potato emergence; suppression of volunteer potato when applied postemergence might occur, however, this herbicides does not effectively control volunteer potato.

clopyralid (Stinger, Curtail, and others)

Dry bean

Control in dry bean is mostly limited to hand removal once tuber initiation has occurred or possibly a wiper or wick application of glyphosate.

Raptor 1SC (imazamox) and/or Basagran 4L (bentazon) do not effectively control volunteer potato in dry bean.

NOTE: Since dry bean is usually planted later than others in southern Idaho, volunteer potato could already be present in the field so there may be an opportunity to implement various control measures before planting. However, if tuber initiation has not begun at this time, then effective control might not be possible.

Onions

The herbicides listed here for volunteer potato in onion may suppress volunteer potato but most likely will not provide effective

control.

oxyfluorfen (Goal and others) – 2 to 3 applications.

NOTE: spray coverage with oxyfluorfen is important – use the appropriate spray gallonage/pressure.

oxyfluorfen + bromoxynil – 2 to 3 applications.

Starane Ultra can be applied at 0.35 pt/A to 4 to 6 inch tall onion, only.

Alfalfa

Raptor (imazamox).

Pursuit (imazethapyr).

2,4-DB.

These alfalfa herbicides can stunt the volunteer potato plants and alfalfa cuttings can further weaken those plants.

Colorado potato beetle are known to be attracted to potatoes that are chemically and physically stressed.

Information included in this list has been gathered from a number of publications and resources including those by Rick A. Boydston, Agronomist, USDA-ARS, Pullman, WA; Don W. Morishita, Professor, Extension Weed Specialist, Superintendent Kimberly R&E Center, University of Idaho; Joel Felix, Associate Professor, Weed Scientist, Malheur Agricultural Experiment Station, Oregon State University; *and from* Colorado State University, Michigan State University, University of Wisconsin, and University of Nebraska.

For further information, refer to the 2005 Washington extension bulletin which includes extensive information on volunteer potato persistence in soil, winter survival, and biology, as well as preventative, cultural, mechanical, chemical, and biological control measures for volunteer potato: *Steiner, C.M., G. Newberry, R. Boydston, J. Yenish, and R. Thornton. 2005. EB1993: Volunteer Potato Management in the Pacific Northwest Rotational Crops. 12 p. Washington State University and USDA*.

"Options for Controlling Volunteer Potatoes." Potato Grower. Published online: Apr 02, 2020 by Erin Burns & Chris Long.

https://www.potatogrower.com/2020/04/options-for-controlling-volunteer-potatoes

Source: Michigan State University Extension

https://www.canr.msu.edu/news/options-for-controlling-volunteer-potatoes

Monitoring airborne crop pests in Idaho

Kasia Duellman, Seed Potato Extension Specialist

In 2018, the University of Idaho in partnership with industry and the Idaho Potato Commission established a network of Burkhard cyclone spore trap samplers across southern regions, from west to east. 2020 marks the third year of operation, a vision led by James Woodhall, Plant Pathologist at the Parma Research and Extension Center and realized in collaboration with Juliet Marshall, Phill Wharton and me. Contents of the spore traps are sent to the James Woodhall lab in Parma, where his team works tirelessly to get the molecular-based test results turned around quickly (within 24 hours of receiving the tubes). Weekly reports for selected airborne pathogens of potato and sugar-beet are available online, at http://www.uidaho.edu/spores and at https://cropalerts.org/ . If you would like to receive a weekly email alert with these updates, please contact me by email at kduellman@uidaho.edu so I can add you to the email list.

Spore trap results and recommendations from the Plant Diagnostic Services lab at the U of I Parma REC for the week of **June 1 through June 8** are below:

Potatoes

- Spore traps have been all deployed in East Idaho with the exception of the American Falls spore trap.
- No spores of *Phytophthora infestans* (late blight), *Alternaria solani* (early blight) or *Sclerotinia sclerotium* (white mold) were detected this week
- This week we have seen several critical humidity periods (CHP), weather stations where we had two CHPs on consecutive days include Glenns Ferry, Kimberly, Rupert, Aberdeen and Ashton. This occurred on the 7 and 8 of June. However, the other model we use for forecasting late blight (MPM) suggests the risk remains low this week.

With relatively cooler and windy conditions in these areas and crops not yet at row closure, we do not recommend changes to spray programs but please remain vigilant in those areas where we had two consecutive CHPs.

Sugar beets

Spores of *Erysiphe betae* (sugar beet powdery mildew) were detected this week at the west Treasure Valley site (one day), Parma (two days) and Glenns Ferry (two days). No spores were detected in Kimberly. We have increased our scouting for of sugar beet powdery mildew in Parma. Typically we see the first visual symptoms on leaves 2-3 weeks after the first detection.

Monitoring for Aphids and PVY

In addition to airborne plant pathogens, a smaller-scale monitoring network tracking aphids in flight in seed potato growing areas was refined and expanded in 2019, in cooperation with the Idaho Crop Improvement Association and with funding from the Idaho Potato Commission. Aphid traps known as the “bucket trap” were deployed last week in seed potato growing areas to help growers identify when aphid flights are occurring. These traps are simply yellow-colored buckets filled with water. A few crystals of copper sulfate are added to inhibit algal growth, and a drop of dish soap is used to break surface tension so the aphids can’t crawl out, but these products are not necessary if traps are checked daily. Our team and others from industry and the ICIA check these traps weekly to determine the number of aphids captured. The contents of the trap are sent to our lab in Idaho Falls, where a research specialist views the samples under the microscope and enumerates the aphids. Such information can potentially provide insight on Potato virus Y (PVY) pressure and when to implement measures such as mineral oil applications (a strategy commonly used by seed potato growers to minimize PVY transmission from infected plants to healthy ones). You can find weekly updates for aphid numbers captured by this network of bucket traps beginning mid-June at this website: https://cropalerts.org/

AG Talk Report

UPCOMING EVENTS

REMAINING 2020 AG TALK TUESDAY SESSIONS

June 16, July 7, July 21, Aug 4 and Aug 18

Ag Talk Tuesday session, live and online.

MORE EVENTS CAN BE FOUND AT:

HTTPS://WWW.UIDAHO.EDU/EXTENSION/NEWS/CALENDAR

Idaho Falls Research & Extension Center 1776 Science Center Drive Idaho Falls, ID 83401 (208) 529-8376
Aberdeen REC 208-397-4181
Kimberly REC 208-423-4691
Parma REC 208-722-6708
Entomology, Plant Pathology & Nematology 208-885-3776
Plant Sciences 208-885-2122
Soil and Water Systems 208-885-0111

CONTACT US

UNIVERSITY OF IDAHO EXTENSION

Mailing Address:
University of Idaho Extension
875 Perimeter Drive MS 2338
Moscow, ID 83844-2338

Phone: 208-885-5883

Fax: 208-885-6654

Email: extension@uidaho.eduWeb:

Editors
Kasia Duellman kduellman@uidaho.edu (208) 757-5476
Pam Hutchinson phutch@uidaho.edu (208) 397-7000, Ext. 109
Juliet Marshall jmarshall@uidaho.edu (208) 529-8376, Ext. 115