

Palo Verde Valley Update

Winter 2021

This past year has been challenging from various aspects: price swings, weather (rain in March which delayed planting, very high night time temperatures which affected cotton yields), human diseases and related effects on agricultural operations, and record levels of blue alfalfa aphids are just a few of these. The verification of roof rats in the area remains a problem for the future, as they can cause damage to both structures and agricultural commodities that grow on trees.

While the University of California Cooperative Extension has not been able to hold in-person educational meetings as we would like due to COVID-19 restrictions, it doesn't mean we were not initiating and/or actively working and cooperating on various field projects in the Palo Verde Valley during 2020.

Some these cooperative projects include determining the effects of alfalfa deficit irrigation on alfalfa pests and their abundance, alfalfa weevil insecticide resistance levels from multiple locations, and contributing beet armyworms for insecticide susceptibility quantification.

The results of local research will be shared as it becomes available, but it will take multiple issues to get all the information out to readers.

If you see a project (see page 12) from this past year and want information, please feel free to contact me. The same is true for other aspect of agricultural production in the Palo Verde Valley as well.

The current University of California Agriculture and Natural Resources directive is for the UCCE-Riverside Palo Verde Valley office to remain closed to the public until June 30, 2021. I am hoping that this changes before this date so that we can again hold Progressive Farmers meetings in person.

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Blue Alfalfa Aphids – What Did We Learn in 2020?

The year 2020 for spring alfalfa was a bit different than normal. The October 2019 freeze in the Palo Verde Valley allowed alfalfa weevils to come out of their summer estivation earlier than normal, and many local alfalfa growers treated for alfalfa weevils in February. Few weevils were present during the March regrowth period if alfalfa had been cut in late February. This allowed for an excellent opportunity to document the effects on the relationships of blue alfalfa aphid feeding damage, insecticide efficacy and resultant yields.

Treatments for 2020 were applied the morning and early afternoon of March 9 with a back-pack sprayer calibrated to deliver 18.6 gpa to a first year stand of ‘Cibola’ alfalfa which averaged 8.4 inches in height (range from 5-12 inches) after being harvested in February. All treatments had the ethylated seed oil Hasten EA added at 12.6 oz./acre (0.53 v/v) with the exception of one treatment

of Sivanto HL which used Induce at the same rate. Aphids were noted as present when treatments were applied but not considered to have reached population levels that would be considered damaging.

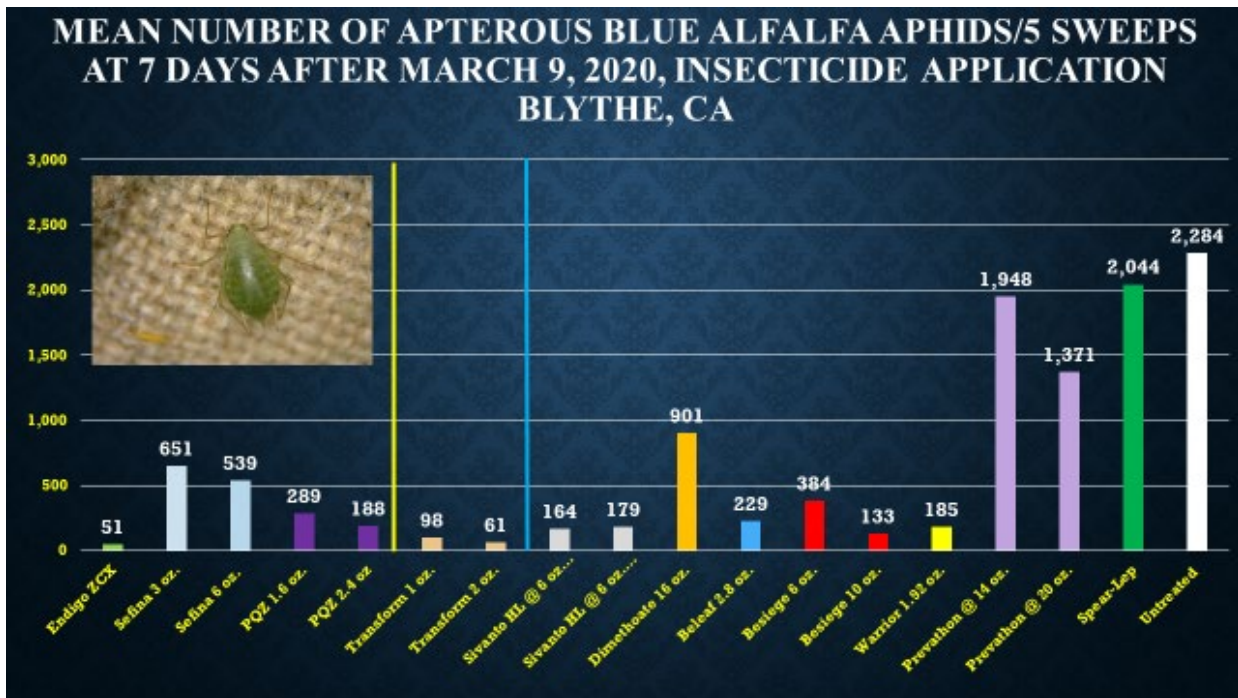
A fairly large weather system moved into the area, with rain beginning the night of March 9 and showers over the next 3 days/nights precluding sweep sampling utilizing a pendulum pattern until 7 days post treatment. Rains have been noted to reduce aphid numbers on alfalfa.

High populations of winged blue alfalfa aphids were noted migrating into the fields based on area water traps, with numbers of 275/square foot over a two day period noted. It is unknown if the migration into alfalfa fields was at, above or below this level however. Damaged alfalfa was noted by 7 days post treatment.



Fig. 1. Alfalfa plots at 7 days post treatment. Note the darker, shorter areas in plots that were damaged by blue alfalfa aphid feeding in one week. Flags are on plot corners.

Aphid control Data were collected for both winged and non-winged aphids to help provide a better understanding of the field situation, especially in light of the high numbers of migrating blue alfalfa aphids. Surprisingly, there was a marked difference in insecticide activity for several products for winged vs. non-winged blue alfalfa aphids. Fewest winged blue alfalfa aphids were noted at 7 days post treatment in plots treated with a dimethoate insecticide and with the high (6 oz./acre) rate of Sefina (Fig. 2). However, these treatments were not as effective in comparison to other insecticides for non-winged aphid (Fig. 3).



Yields

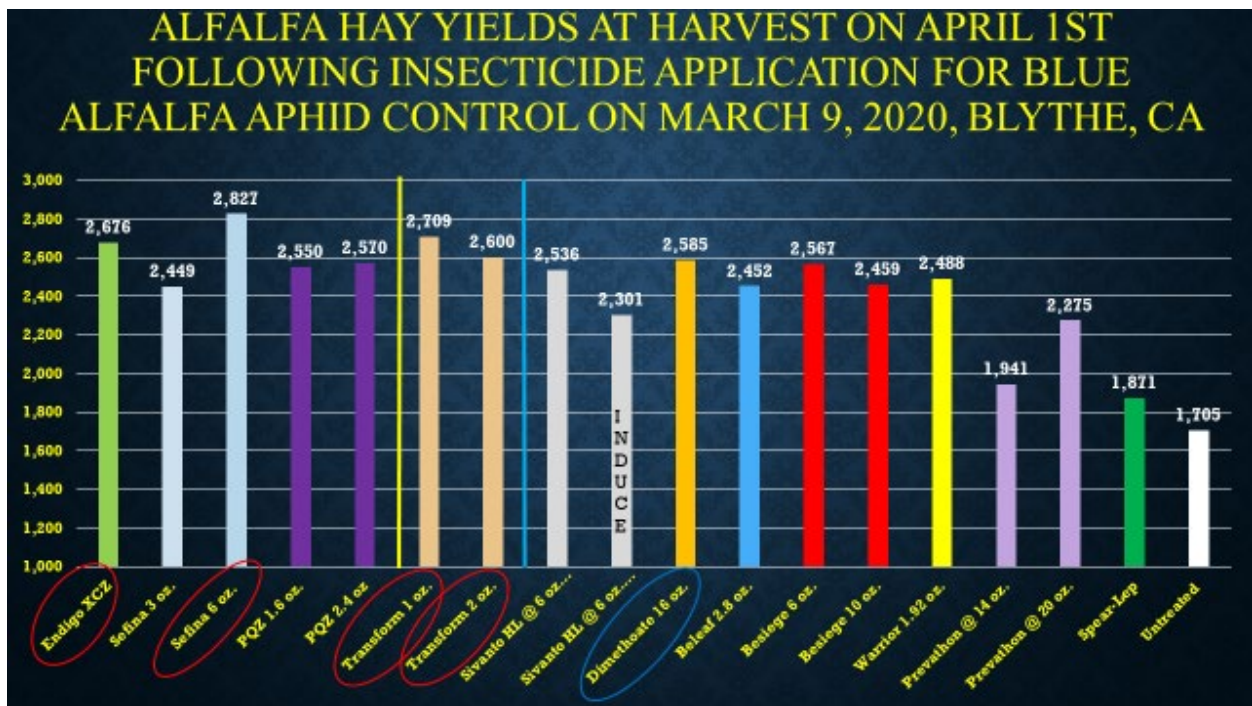
Yield data were obtained on April 1, utilizing small square harvests (square was slightly over 2 x 2 ft.), and then drying weighting the cut alfalfa. All treatments resulted in slight to large (1,000 lbs.+) increases in hay yields when compared with untreated alfalfa.

The yields reflected the aphid numbers at 7 days post treatment, as treatments with highest yields were those that had fewest aphids, although this was also somewhat affected by long control after this sample date.

It should be noted that the four treatments resulting in the highest yields (6 oz., of Sefina, both rates of Transform WG and Endigo ZCX) are not currently registered for usage in California low desert alfalfa.

These data indicate that the winged aphids may be doing more damage than the non-winged aphids. While the damage attributed to the various aphid life stages have not been examined in alfalfa, it is logical that the larger winged aphids would remove more liquids through their feeding than smaller aphids, and may also be injecting more toxin into plants as well.

Insecticide efficacy grades for the entirety of the 2020 experiment are shown in the grade charts on the following pages. Please note that the grading scale is different for winged vs. non-winged aphids.



Apterous Blue Alfalfa Aphid Insecticide Control Grades from 2020 trial

Michael D. Rethwisch, Farm Advisor, UCCE-Riverside County

January
2021

		# data points	Days post treatment			
			7	11	15	19
PRODUCTS/ACTIVE INGREDIENTS REGISTERED FOR USAGE ON ALFALFA HAY IN CALIFORNIA						
Insecticide and Rate/acre						
Beleaf (<i>SLN label</i>)	2.8 oz.	1	A-	B-	F	<F
Besiege	6 oz.	1	B-	C+	F-	<F
	10 oz.	1	A	B+	D+	<F
Dimethoate	16 oz.	1	D-	D-	<F	<F
L-cyhalothrin (<i>Warrior II</i>)	1.92 oz.	1	A-	A-	D+	<F
Prevathon	14 oz.	1	<F	<F	<F	<F
	20 oz.	1	<F	<F	<F	<F
Sivanto HL	6 oz.	2	A-	B	C	<F
NOT CURRENTLY REGISTERED FOR USE ON CALIFORNIA LOW DESERT ALFALFA HAY						
Endigo ZCX	4.5 oz.	1	A+	A-	B	<F
PQZ	1.6 oz.	1	B+	C+	<F	<F
	2.4 oz.	1	A-	B-	D-	<F
Sefina	3 oz.	1	C-	D+	<F	<F
	6 oz.	1	C	C	<F	<F
Transform WG	1 oz.	1	A	B+	F-	<F
	2 oz.	1	A+	A-	D+	<F

Grade relationship to percent control		
A+ = 97-100	A = 94-97	A- = 90-94
B+ = 87-89.9	B = 84-87	B- = 80-84
C+ = 77-79.9	C = 74-77	C- = 70-74
D+ = 67-69.9	D = 64-67	D- = 60-64
F+ = 57-59.9	F = 54-57	F- = 50-54
<F = less than 50% reduction compared to untreated check		

Alate (*winged*) Blue Alfalfa Aphid Insecticide Control Grades from 2020 trial

Michael D. Rethwisch, Farm Advisor, UCCE-Riverside County

January
2021

	# data points	Days post treatment			
		7	11	15	19
PRODUCTS/ACTIVE INGREDIENTS REGISTERED FOR USAGE ON ALFALFA HAY IN CALIFORNIA					

Insecticide and Rate/acre						
Beleaf (<i>SLN label</i>)	2.8 oz.	1	C+	C	C+	C-
Besiege	6 oz.	1	D+	C+	D-	C-
	10 oz.	1	C-	C+	C	C-
Dimethoate	16 oz.	1	B-	C	D-	F
L-cyhalothrin (<i>Warrior II</i>)	1.92 oz.	1	C-	C-	C	C-
Prevathon	14 oz.	1	F	F	F	D-
	20 oz.	1	F	F	D-	D+
Sivanto HL	6 oz.	2	C+	D+	B-	C+

NOT CURRENTLY REGISTERED FOR USE ON CALIFORNIA LOW DESERT ALFALFA HAY
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Endigo ZCX	4.5 oz.	1	C-	D+	C-	C+
PQZ	1.6 oz.	1	C+	C-	C	C
	2.4 oz.	1	C	C-	B	C
Sefina	3 oz.	1	C+	D+	C+	D
	6 oz.	1	B-	C	B-	C-
Transform WG	1 oz.	1	D+	B-	C+	C+
	2 oz.	1	D-	C+	C+	C+

Grade relationship to percent control		
A+ = 93-100	A = 87-93	A- = 80-87
B+ = 73-80	B = 67-73	B- = 60-67
C+ = 53-60	C = 47-53	C- = 40-47
D+ = 33-40	D = 27-33	D- = 20-27
<F = less than 20% reduction compared to untreated check		

Blue Alfalfa Aphid Insecticide Control Grades from 2020 trial, all forms

Michael D. Rethwisch, Farm Advisor, UCCE-Riverside County

January
2021

# data points	Days post treatment			
	7	11	15	19
PRODUCTS/ACTIVE INGREDIENTS REGISTERED FOR USAGE ON ALFALFA HAY IN CALIFORNIA				

Insecticide and Rate/acre						
Beleaf (SLN label)	2.8 oz.	1	B	C+	F	<F
Besiege	6 oz.	1	C	C-	<F	<F
	10 oz.	1	B	B-	D	<F
Dimethoate	16 oz.	1	D-	F+	<F	<F
L-cyhalothrin (Warrior II)	1.92 oz.	1	B	B-	D	<F
Prevathon	14 oz.	1	<F	<F	<F	<F
	20 oz.	1	<F	<F	<F	<F
Sivanto HL	6 oz.	2	B-	C-	C	<F

NOT CURRENTLY REGISTERED FOR USE ON CALIFORNIA LOW DESERT ALFALFA HAY

Endigo ZCX	4.5 oz.	1	B+	B-	C	F-
PQZ	1.6 oz.	1	B-	C-	<F	<F
	2.4 oz.	1	B	C-	D	<F
Sefina	3 oz.	1	D-	D-	<F	<F
	6 oz.	1	C+	C-	<F	<F
Transform WG	1 oz.	1	B	B	F-	<F
	2 oz.	1	B	B	D	<F

Grade relationship to percent control		
A+ = 97-100	A = 94-97	A- = 90-94
B+ = 87-89.9	B = 84-87	B- = 80-84
C+ = 77-79.9	C = 74-77	C- = 70-74
D+ = 67-69.9	D = 64-67	D- = 60-64
F+ = 57-59.9	F = 54-57	F- = 50-54
<F = less than 50% reduction compared to untreated check		

Onion/Garlic Fungicide Registrations

Rains and dewy, wet conditions are often conducive for diseases of growing crops. PCAs and growers will be watching for any new fungal developments on our local crops as winter turns to spring, especially onions and garlic where diseases such as garlic rust can be challenging to control.

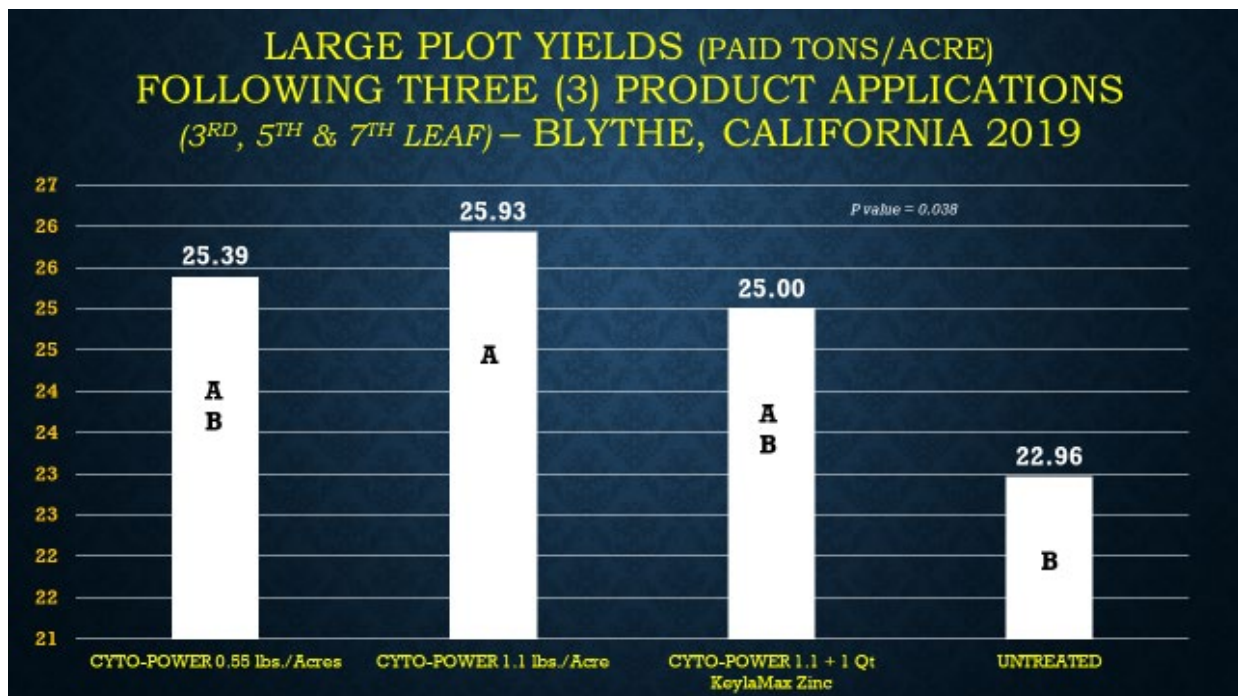
Several new fungicides have recently received registration for use in California. Aprovia® Top targets rust, powdery mildew, purple blotch, Stemphyllium leaf blight and stem rot, and Cladosporium leaf blotch. This fungicide has substantial activity against garlic rust.

Orondis® Opti is registered for usage on garlic and onions for control of botrytis, purple blotch and downy mildew control, while Orondis® Ultra only has downy mildew listed on its label. All three products are from Syngenta Crop Care.

Dehydrator Onion Yield Response to Biostimulants in the Palo Verde Valley

Several field trials have been conducted on dehydrator onions the past two years. Trials for the 2019 harvest evaluated two rates (0.55 and 1.1 lbs./acre) of the product CytoPower, a 3-0-8 product that contains extracts from *Ascophyllum nodosum* (a species of seaweed) and hydrolyzed soy protein. The high (1.1 lb./acre rate) was applied with and without 1 qt./acre of KeylaMax Zinc. This trial consisted of replicated large plots that were treated at the 3rd, 5th and 7th leaf stages, and were commercially harvested in July.

All three CytoPower treatments resulted in substantial tonnage increases with the best treatment averaging almost 3 tons/acre more than untreated onions in this field as shown below. This increase resulted in a value difference of over \$400/acre.



2020 Production Year Trials

Trials for 2020 utilized small plots (6 beds x 30 feet) which allowed comparison of multiple products. Most of these products had not been tested under Palo Verde Valley growing conditions, and may also be the first time biostimulant products have been compared on dehydrator onions. Unlike the 2019 experiment where three (3) applications were made, COVID-19 related restrictions prohibited the third application at the seventh (7th) leaf stage, thus only two (2) applications were made in 2020.

Two sets of trials were conducted, with one location testing products applied post-planting and prior to germination water, with some testing of combinations of pre-germination + foliar applications. The second set of experiments tested only foliar applied products.

Pre-germination initiated trial

Products used in this experiment were Guarantee[®] Complex, Liquid Seaweed Concentrate, Penergetic K and Penergetic P.

Guarantee[®] Complex is a product from Ocean Organics (Waldoboro, ME). It has a 0.2-0-6 nutritional fertility component, derived from seaweed extract (*Ascophyllum nodosum*), potassium sulfate, soy protein hydrolysate, and potassium hydroxide. All Guarantee Complex treatments had a 32 oz./acre application at post-plant/pre-germination. Four additional foliar treatment regimens were also built on this base foundation application:

- a) 1 qt./acre at three (3) leaf stage (January 31)
- b) 1 qt./acre. at three (3) leaf + fifth leaf stages of development (late February)

- c) 3 qts./acre at the three (3) leaf stage
- d). 3 qts./acre./acre at third (3rd) leaf + fifth (5th) leaf stages of development

Liquid Seaweed Concentrate is a 100% Liquid Seaweed Concentrate from Acadian Seaplants Limited (Dartmouth, Nova Scotia). This product consists of various extracts from a North Atlantic seaweed species (*Ascophyllum nodosum*), and has a nutritional 0.1-0-5 fertility component. This product was applied at 64 oz./acre at two treatment timings relative to crop development:

- a). Post planting/pre-germination only
- b). Fifth (5th) leaf stage of development
- c). Combination of pre-germination plus fifth (5th) leaf.

The other treatment in this experiment was 7 oz./acre of **Penergetic K** applied to soil surface prior to germination water followed by 3.5 oz./acre of **Penergetic P** at the three (3) leaf stage. Penergetic P and Penergetic K are both from Penergetic Solutions (Monroe, WA).

Penergetic K labeling indicates it consists of bentonite and molasses, and acts as a soil activator, improving soil fertility stimulating soil microorganisms that accelerate the decomposition of field residue and assisting to release fixed nutrients (e.g. phosphorus) locked up in clay and organic soil particles.

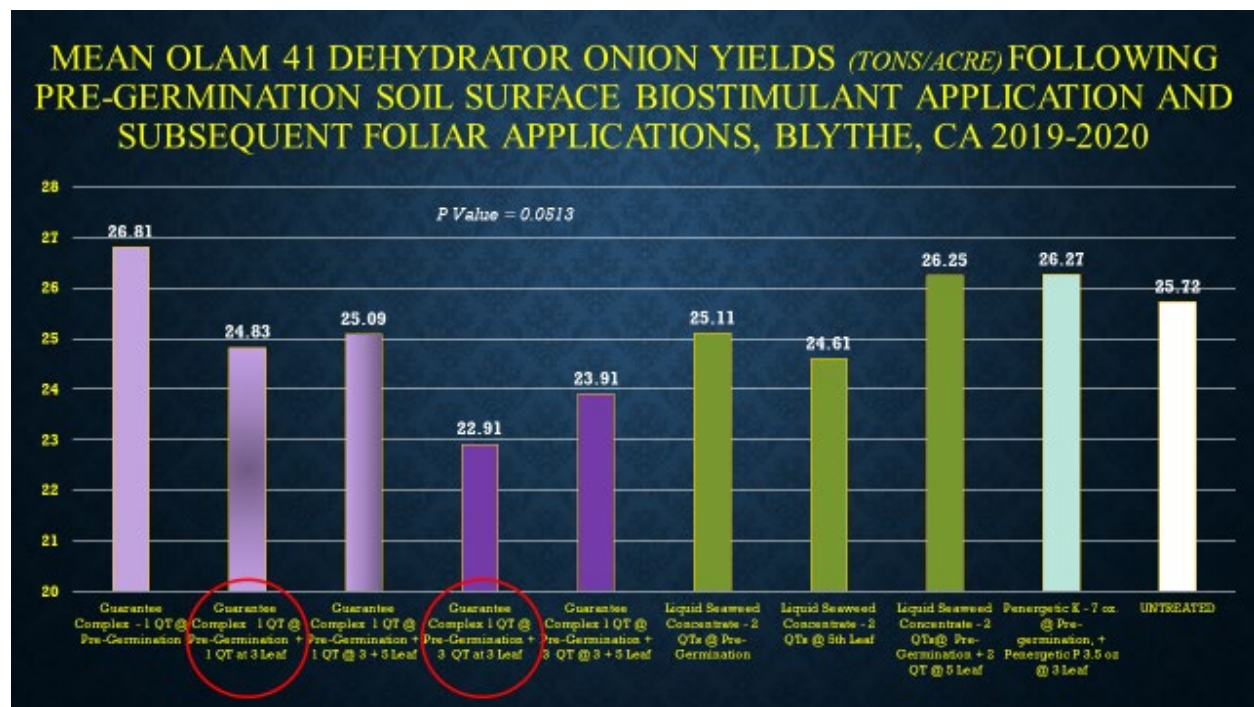
Penergetic P consists of beet molasses, calcium bentonite and calcium carbonate. Product literature indicates the product strengthens plant's productive capacity and natural defenses via increases in root development, increases of mycorrhizal fungi, and promotion of greater chlorophyll and photosynthesis levels.

Yields

Plots were harvested in early July 2020. After being commercially dug from the soil, a five (5) foot section of each of the six (6) beds was collected by hand, transferred to a container and then weighed in the field.

Three (3) treatments resulted in higher numerical yields than untreated dehydrator onions (25.72 tons/acre). Highest yields were noted from the Guarantee Complex applied prior to germination (26.81 tons/acre), the pre-germination and foliar combination treatment of Liquid Seaweed Concentrate (26.25 tons), and the Pengergetic treatment (26.27 tons).

It was interesting to note that the Guarantee Complex treatment appears to have a detrimental effect when applied at the 3 leaf stage resulted in a yield decrease, with the 3 qt/acre rate reducing yields even more so than the 1 qt./acre rate. Applications at 5th leaf stage resulted in higher yields when compared with yields from treatments applied at 3rd leaf.



Foliar only products

Six products were evaluated in this experiment, with most treatments (*unless specifically noted*) having the modified ethylated vegetable oil (ESO) concentrate Hasten-EA™ (Wilbur-Ellis Company) added as adjuvant at 8 oz./acre (0.35 v/v).

Action (a calcium product from Stoller USA) was applied at 8 oz./acre at the third (3rd) and fifth (5th) leaf stages.

Advantigro (Wilbur-Ellis Company) was applied at the rate of 6 oz./acre at both third (3rd) and fifth (5th) leaf stages. This product contains small amounts of three plant hormones: Cytokinin (kinetin) at 0.0008 lbs./gallon (0.009%), indole butyric acid (IBA) at 0.0004 lbs./acre (0.005%), and gibberellic acid (GA-3) at 0.0004 lbs./gallon (0.005%).

CytoPower, the 3-0-8 product from MilAgro Inc., that was previously discussed was applied at 1.0 lb./acre along with 1 qt./acre of KeylaMax Zinc, and 1 qt./acre of KeylaMax Multimax. The latter product is a 3-0-0 fertilizer that also contains 1.5% zinc, 1% magnesium, 2% manganese, 0.25% boron, 0.25% iron, 0.1% cobalt, 0.1% molybdenum, and 3% sulfur. No surfactant was used with this treatment.

RyzUp SmartGrass® 40WDG (Valent USA) is a naturally occurring plant growth regulator (Gibberellic Acid - 3) that promotes growth through cell expansion. This OMRI listed product was applied at the rate of 0.3 oz./acre at only the two (2) leaf stage of development. The non-ionic surfactant ClassAct NG (Winfield Solutions) was used with this product.

Transit™ Foliar (FBSciences, Collierville, TN) contains 0.5% zinc, and contains complex polymeric polyhydroxy acids (CPPA), a broad-spectrum plant growth regulator used to stimulate root and shoot growth, and improve the plant's ability to withstand stress. It was used at eight (8) oz./acre at the three (3) leaf stage. This product was scheduled for a second application to be made when bulbs reached golf-ball size, but did not happen in this experiment to the COVID-19 restrictions. No surfactant was used with this treatment.

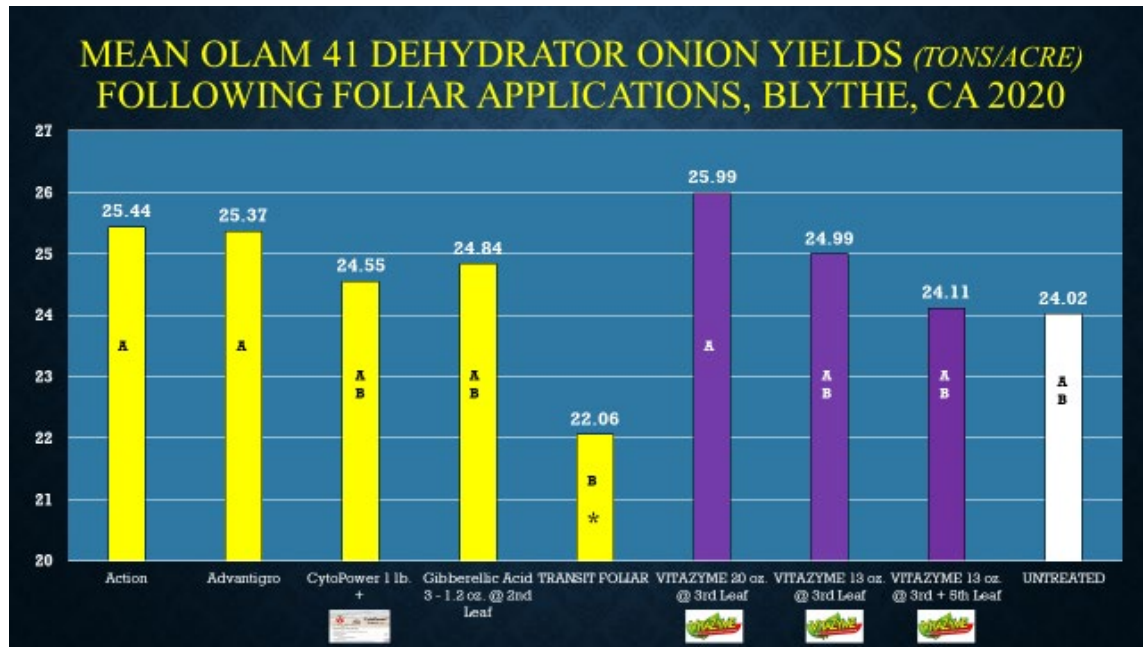
Vitazyme® (Vital Earth Resources, Gladewater, TX) is an all natural biostimulant concentrate microbially synthesized from plant materials. There are many compounds in Vitazyme®, including brassinosteroids, 1-triacontanol, kinetin, gibberellic acid, indoleacetic acid, biotin, folic acid, niacin, pantothenic acid, and vitamins B-1, B-2, B-6 and B-12.

Vitazyme® was applied once at both 13 and 20 oz./acre at the 3 leaf stage. A third treatment consisting of 13 oz./acre applications at both (3rd) and fifth (5th) leaf stages was also evaluated.

Plots were harvested in early July 2020. After being commercially dug from the soil, a five (5) foot section of each of the six (6) beds was collected by hand, transferred to a container and then weighed in the field.

A numerical yield increase was noted from most treatments, with highest yields noted from the 20 oz./acre rate of Vitazyme applied at the 3rd leaf stage.

Experiments are being repeated in 2021 to help provide increased confidence in results.



Thank you to 2020 Field Trial Cooperators

The University of California Cooperative Extension is successful in the Palo Verde Valley due in great part to the many growers, PCAs, industry personnel and others that cooperate in some form for field trials to be initiated and data obtained. We owe these Palo Verde Valley individuals and farming entities a BIG thank you for their contribution to field trials that were initiated during 2020, as the results will be of value to all involved with agriculture in the Palo Verde Valley.

Chaffin Farms (Grant Chaffin and Greg Anderson) – Alfalfa whitefly insecticide comparisons; cotton heat stress mitigation

Van Dyke Farms (Charles Van Dyke) - Blue alfalfa aphid insecticide trial; alfalfa weevil insecticide product evaluation

Coxco Farms (Tim Cox) – Alfalfa summer heat stress mitigation

Fisher Ranches (Branden Brown, Andrew Fisher) – Garlic biostimulant; onion biostimulants

Noroian Farms (Nisha Noroian)– Teff seed plant growth regulator trial

Quail Mesa Farms (Jim Lloyd) – Alfalfa fungicide comparisons

Rio Rancho (Aaron Palmer) – Onion biostimulants; cotton heat stress mitigation; Pima cotton variety comparison

River Valley Farms (Craig Elmore) – Organic alfalfa weevil insecticide product evaluation

Rich Wellman, CropCare - Assistance with finding several experimentation sites, and cooperation and interactions to insure that integrity of several research plots was not compromised.

Old Cucurbit Pest Makes New Appearance In California Cantaloupes



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During the spring 2020 melon season, local pest control advisors (PCAs) in the Palo Verde Valley of far eastern California began noticing damage which appeared as tunneling on the outer rind of cantaloupes (*Cucumis melo* var. *cantalupensis*) (Fig. 1) from multiple commercial fields.



Fig. 1. Damaged cantaloupe rind.

Further investigation found the caterpillars that were causing the damage (Fig. 2).

Entomologists in the low desert with 30+ years of melon experience did not recognize the damage or the pest.



Fig. 2. Cantaloupe with tunneling (arrow) and causal caterpillar (circled).

Caterpillars under magnification were noted to have almost transparent setae, and distinctive white markings on each thoracic and abdominal segment (Fig. 3).



Fig. 3. Setae and white marks evident under magnification.

Caterpillars were provided cantaloupe leaves, which they ate and silked together (Fig. 4). Feeding on leaves was not noted in fields.



Fig. 4. Larvae fed upon and silked leaves together.

Reared adults (Fig. 5) from caterpillars were determined to be omnivorous leafroller (*Platynota stultana*) by Dr. Marc Epstein with the California Department of Food and Agriculture.

This insect was a serious pest of Arizona melons in the 1930s-1950s, prior to widespread availability of many insecticides. It was noted as not only tunneling on cantaloupes but also honeydew melons, *C. melo* L. (Inodorus Group) 'Honey Dew'.



Fig. 5. Adult omnivorous leafroller.

Low pest pressures during spring 2020 production season resulted in fewer insecticide applications targeting lepidopterous pests. Tunneling was also noted on cantaloupes in fall 2020 fields where treatments were not applied for other caterpillar pests.

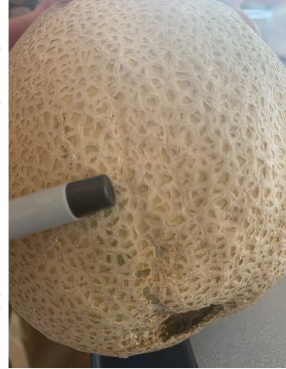


Fig. 6. Tunneling often healed before cantaloupes reached maturity.

This edition of the Palo Verde Valley Update is brought to you by Michael D. Rethwisch, Crop Production and Entomology Farm Advisor, UCCE-Riverside County, Palo Verde Valley Office, 290 N. Broadway, Blythe, CA 92225-1649 mdrethwisch@ucanr.edu (760) 921-5064.

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For local inquiries call 760-921-5060 (UCCE Riverside County- Palo Verde Valley office) or contact the UCCE-Riverside Moreno Valley office at 951-683-6491.