Features

From your Farm Advisors

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Table of Contents

EVALUATION OF SOME WORM CONTROL INSECTICIDE IN CABBAGE, 2013

Eric T. Natwick, UCCE Imperial County
Martin I. Lopez, UCCE Imperial County

The objective of the study was to evaluate the efficacy of various insecticides against worm pests (BAW, CL and DBML) on cabbage under desert growing conditions. Cabbage (Headstart) was direct seeded on 19 Sep 2013 at the University of California Desert Research and Extension Center, El Centro, CA into double row beds on 40 inch centers. Stand establishment was achieved using overhead sprinkler irrigation, and furrow irrigation was used thereafter. Plots were four beds (13.3 ft.) wide by 40 ft. long and bordered by one untreated bed. Four replications of each treatment were arranged in a RCB design. Insecticidal compounds, formulations and application rates are provided in the table. All insecticide treatments were foliar sprays applied on 30 Oct 2013 with a Lee Spider Spray Trac Tractor, 4-row sprayer with three TJ-60 11003VS nozzles per row that delivered 51 gpa at 29 psi. An adjuvant, MSO (DuPont TN MSO-D-17F0684 100% methylated seed oil, Wilmington, DE) was added at 0.5% vol./vol. to each foliar spray mixture. Numbers of BAW, CL and DBML from 10 plants per replicate were counted on 23 Oct 2013 7 days prior to treatments (7-DPT) and from 25 plants per replicate in each treatment were recorded on 6 Nov, 7 (7-DAT), 13 Nov (4-DAT), 19 Nov (20-DAT), and on 26 Nov (27-DAT). Data were analyzed using ANOVA. Differences among means on each sampling date and in each experiment were determined using Least Significant Difference Test (P=0.05).

Worm pest pressure was low throughout the study. Worm pests included BAW (18.07%), CL (79.52%) and DBML (2.41%). No differences in the numbers of worm pests were detected among the treatments on 23 Oct (7-DPT). With the exception of IKI-3106 50 SL at 11.0 oz/acre on 27-DAT, all insecticide treatments had significantly fewer worm pests than the untreated check following the single application on 30 Oct and all insecticide treatments had lower numbers of worms than the untreated check for the PTA. IKI-3106 50 SL (A.I. Cyclaniliprole) is a Diamide class of insecticide with the under development in the U.S. by ISK (Ishihara Sangyo Kaisha, Ltd. Nishi-ku, Osaka Japan) and is not yet registered for sale or use in U.S. at the time of this publication.

Table 1.

Treatment/formulation	Rate amt Oz/acre	Worm pests (BAW, CL and DBML) per 25 plants					
		7-DPT[y]	7-DAT	14-DAT	20-DAT	27-DAT	PTA[z]
IKI-3106 50 SL	11.0	0.00 a	0.00 b	0.75 b	2.25 a	2.25 ab	1.31 b
IKI-3106 50 SL	16.4	0.00 a	0.00 b	0.25 b	0.00 b	0.00 c	0.06 c
Coragen 1.67 SC	5.0	0.00 a	0.00 b	0.00 b	0.00 b	0.00 c	0.00 c
Exirel 10SE	13.5	0.00 a	0.00 b	0.00 b	0.00 b	0.00 c	0.00 c
Intrepid 2F + Warrior	10.0 + 3.0	0.00 a	0.00 b	0.00 b	0.25 b	0.50 bc	0.19 c
Radiant SC	5.0	0.50 a	0.00 b	0.00 b	0.00 b	0.00 c	0.00 c
Belt 4 SC	1.5	0.00 a	0.00 b	0.00 b	0.00 b	0.00 c	0.00 c
Untreated check	--------	0.00 a	2.75 a	3.50 a	4.00 a	3.75 a	3.50 a

[y] Days prior to treatment.
[z] Post treatment averages.
Means within columns followed by the same letter are not significantly different, P > 0.05, LSD.

BEET CURLY TOP VIRUS

a potential economic consideration for low desert sugarbeet growers

Oli Bachie - UCCE Imperial County - Agronomy Advisor
Steve Kaffka - UCD - Agronomy Specialist

This article was stimulated by the recent observation of heavy infestation of sugar beet with Beet Curly Top Virus (BCTV) at the Desert Research and Extension Center. This late-planted crop (October 22) was heavily infested by the May harvest. Normally, BCTV is not a significant economic problem in the Imperial Valley. While BCTV is not considered a major crop pest in the low desert, exceptionally favorable weather events and vector population dynamics may cause it to increase in occurrence.

Figure 1: BCTV infected beet leaves with characteristic symptom of the virus

BCTV has not been an economically important pest in the low desert, but has detrimentally affected sugar beet growers in the San Joaquin Valley since its 1907 discovery in California. The degree of infestation at the DREC trial was unexpected and growers' reports from the Imperial Valley area suggest that BCTV infection was more common in 2013-14. This short article is to inform sugar beet growers and PCAs of the low desert that BCTV could be a potential pest problem on sugar beets and other susceptible crops. Therefore, it is important to be vigilant and consistently scout crop fields for the presence of the virus and leafhoppers.

Figure 2: Darkened vascular rings in sugarbeet infected with BCTV (source: Kaffka et. al.)

BCTV is a pathogenic plant virus of the family Geminiviridae, containing a single-stranded DNA (http://en.wikipedia.org/wiki/Beet_curly_top_virus). There are three categories of curly top viruses; *Beet curly top virus* (BCTV), *Beet severe curly top virus* (BSCTV), *Beet mild curly top virus* (BMCTV) (http://www.ipm.ucdavis.edu/PMG/r735100411.html). All types are characterized with dwarfing, crinkling, and rolling upward and inward of the infected leaves, as shown in figure 1. Infected roots of sugar beet may show dark rings of vascular tissue in the early stages of infection (Figure 2). At later stages, complete root death can occur, often in combination with other root rots. Age at infection influences the amount of loss to this pathogen. Younger plants are more susceptible to damage than adult plants and early infection in fields can lead to economic loss of the crop. BCTV tend to infect more dicotyledonous hosts than monocotyledonous plants. The most susceptible crops are sugar and table beets, sugar beet, Swiss chard, spinach, tomato, pepper, bean, cucurbits and many ornamental species. Infected plants will tend to display early symptoms as soon as five days from infection, including: Vein swelling, leaf curling (Figure 1), yellowing of leaves with purple veins, necrosis and hyperplasia of the phloem, fruit deformation, premature fruit ripening, reduced fruit quality and yield, stunting and death of young seedlings. Yield loss of infected crops increases with increasing intensities of BCTV infection (Strausbaugh and Gillen, 2007, Kaffka et al, 2002).

BCTV is vectored by the beet leafhopper, *Circulifer tenellus* which has an extensive host range, high reproductive capacity and long distance migrations. The leafhopper, the only known vector, (http://www.cdfa.ca.gov/plant/ipc/curlytopvirus/ctv_hp.htm CDFA) acquires the virus when it feeds on infected plants and transmits them onto other plants (http://www.dpvweb.net/dpv/showdpv.php?dpvno=210). Another means of BCTV transmission is through Dodder (*Cuscuta spp),* a parasitic weed that can transmit the virus when infected dodder grows on other healthy plants (http://www.dpvweb.net/dpv/showdpv.php?dpvno=210). Severity of curly top disease in sugar beet depends on climatic factors that influence the prevalence of weed hosts, reproductive capacity and migration of the leafhopper vectors.

Figure 1: Adult beet leafhopper

BCTV, like any other viruses is difficult to control. However if there are reasonable threats from the virus and the hosts, growers can use the following approaches, individually or in combinations; (1) selectively cull and destroy infected plants if occurrences are spotty, (2) use BCTV tolerant varieties, (3) use seed treatments like clothianadin or imidicloprid (4) control the vectors (leafhopper) with recommended pesticides, (5) plant early and maintain vigorous crop growth since closed canopies are less susceptible to infection than isolated plants and (6) destroy old crops and weed hosts. Seed treatments help improve stand establishment by also reducing flea beetle damage on emerging seedlings, so are generally useful and recommended. An integrated pest management approach that reduces the intensity of crop infection below threshold levels would be the best strategy (http://www.cdfa.ca.gov/plant/ipc/curlytopvirus/ctv_hp.htm). Growers can also contact their respective PCAs and area farm advisors for additional support.

For more information, please read the following materials;

Kaffka S. et al. BEET CURLY TOP VIRUS (BCTV), BEET SEVERE CURLY TOP VIRUS (BSCTV), BEET MILD CURLY TOP VIRUS (BMCTV). UC IPM Pest Management Guidelines: Sugarbeet UC ANR Publication 3469., Turini T. A., and M. Wintermantel, UC IPM Pest Management Guidelines: Sugar Beet, UC ANR Publication # 3469. http://www.ipm.ucdavis.edu/PMG/r735100411.html

Kaffka, S.R., W.M. Wintermantel and R.T. Lewellen. 2002. Comparison of Soil and Seed Applied Systemic Insecticides to Control Beet Curly Top Nirus in the San Joaquin valley. J. sugar beet research. 39 (3-4): 59-74.

Plant Health & Pest Prevention Services. http://www.cdfa.ca.gov/plant/ipc/curlytopvirus/ctv_hp.htm

Strausbaugh C.A. and A.M. Gillen. 2007. Relationship of Beet Curly Top Foliar Ratings to Sugar Beet Yiled. Plant Disease 91(11): 1459-1463

Thomas P.E. and G.I Mink. United States Department of Agriculture, Science and Education Administration. http://www.dpvweb.net/dpv/showdpv.php?dpvno=210

IMPROVING FLOOD IRRIGATION SYSTEMS FOR WATER AND NUTRIENT CONSERVATION

Khaled M. Bali, UCCE Imperial County

Efficiency of surface irrigation systems can be improved by several practical measures. Improvements in surface irrigation efficiency can be achieved by minimizing water losses associated with surface irrigation systems. Most of the water losses in surface irrigation systems can be reduced by managing surface runoff and deep percolation below the root zone. However, measures to improve flood irrigation can be competitive, i.e. measures that reduce deep percolation can increase surface runoff and vice versa. Some measures commonly recommended include the following:

1) Recover and reuse surface runoff: Recirculation systems (commonly called runoff recovery, tailwater-return systems, or storage-reuse systems), can dramatically improve efficiency of flood irrigation systems. Recirculation systems involve collecting the surface runoff in a small reservoir at the lower end of the field and then recirculating the water back to the "head" of the field during irrigation, using a low lift pump and a buried or portable pipeline. The recycled water should be used to irrigate an additional area of the field or mix it with irrigation water. Simply recirculating the runoff back to the same irrigation set that generated the runoff results only in temporarily storing the water on the field and will result in an increased rate of runoff.

Similarly, a storage/reuse system involves storing all of the surface runoff from a field and then using that water to irrigate another field at the appropriate time. This approach requires a farm with multiple fields, a relatively large reservoir and distribution systems to convey surface runoff to the storage reservoir and to convey the stored water to the desired fields.

Care should be taken that water quality is not degraded from the storage-reuse systems. Pesticides have been found to infiltrate groundwater on some soil types, primarily from catchment basins. Steps to seal basins from subsurface infiltration may be effective at preventing contamination in light soils.

Runoff recovery systems could be used in the Imperial Valley to conserve water and nutrients and improve the quality of drainage water. The majority of the fields in the Imperial Valley are irrigated with surface irrigation systems (furrow and border-strip irrigation) and runoff or tailwater is necessary in furrow irrigation and in some border-strip irrigation to irrigate the lower end of the field and provide sufficient irrigation time at the end of the field for maximum uniformity. The surface runoff water could be collected in a pond at the end of the field and reused in the same or different field. The use of runoff recovery system is practical for all field crops in the Imperial Valley and most furrow-irrigated vegetable crops. However, with vegetable crops, additional measures may need to be implemented to comply with leafy greens marketing agreement and food safety standards.

2) Increasing check flow rate: This commonly recommended measure reduces the advance time to the end of the field, thus decreasing variability in infiltration times along the field length. However, caution should be exercised with this approach such that the increased flow rate does not increase soil erosion. This option may not be practical when the on-farm irrigation canals are not designed for high flow rates as it is the case for most

fields in the Imperial Valley. In addition, concerns about increased concentration of sediment in runoff water may increase the load of nutrients (mainly nitrogen and phosphorous) and pesticides in runoff water.

3) Reducing field length: This is the most effective measure for improving uniformity and for reducing percolation rate below the root zone. Studies have shown that shortening the field length by one-half can reduce percolation by at least 50 percent. The distribution uniformity (DU) of infiltrated water will be increased by 10 to 15 percentage points compared with the normal field length. The new advance time to the end of the shortened field generally will be 30 to 40 percent of the advance time to the end of the original field length. Thus, the irrigation set time must be reduced to account for the new set time. While this method is effective in increasing uniformity, a major problem with this method is the potential for increased surface runoff, which could be two to four times more runoff for the reduced length compared with the original field length (Hanson, 1989). This option may not be practical for most fields in the Imperial Valley and requires major and costly modifications to the irrigation system.

4) Selecting an appropriate irrigation water cutoff time: The amount of surface runoff or tailwater can be greatly reduced by decreasing the cutoff time of the irrigation water. This is the most effective measure for reducing surface runoff. The cutoff time for a given field may need to be determined on a trial-and-error basis. The cutoff time should occur before the water reaches the end of the field except for sandy soils with high infiltration rates. However, the cutoff time should allow sufficient water to infiltrate the end of the field. Some guidelines, however, are to cut off the irrigation water when the water advance is about 60% of the field length for fine-textured soil, 70% to 80% for medium texture soil, and near 100% for coarse textured soil. A procedure for estimating the cutoff time for cracking clay soil has been developed by the University of California (Bali et al., 2001).

References:

Bali, K. M., M. E. Grismer, and I. C. Tod. 2001. Reduced-Runoff Irrigation of Alfalfa in Imperial Valley, California. American Society of Civil Engineers, Journal of Irrig. & Drain. Engr. Vol. 127, No. 3, 123-130.

Hanson, B. R. 1989. Drainage reduction potential of furrow irrigation. California Agriculture 43(1):6-8.
Sanden, Blake. 2008. Essential Water Management Practices for Flood Irrigation. Kern County.

Schwankle et al. 2007. Reducing Runoff from Irrigated Lands- Tailwater Return systems. ANR Publication 8825

CIMIS REPORT AND UC DROUGHT RESOURCES

Khaled M. Bali, UCCE Imperial County
*Sharon Sparks *, Imperial Irrigation District*

California Irrigation Management Information System (CIMIS) is a statewide network operated by California Department of Water Resources. Estimates of the daily reference evapotranspiration (ET_o) for the period of October 1 to December 31 for three locations in the Imperial County are presented in Table 1. ET of a particular crop can be estimated by multiplying ET_o by crop coefficients. For more information about ET and crop coefficients, contact the UC Imperial County Cooperative Extension Office (352-9474) or the IID, Ag Water Science Unit (339-9082). Please feel free to call us if you need additional weather information, or check the latest weather data on the worldwide web (Google CIMIS for the current link to CIMIS site).

Table 1. Estimates of daily Evapotranspiration (ET_o) in inches per day

Station	January		February		March	
	1-15	16-31	1-15	15-28	1-15	16-31
Calipatria	0.08	0.09	0.12	0.14	0.18	0.22
El Centro (Seeley)	0.08	0.09	0.12	0.14	0.16	0.20
Holtville (Meloland)	0.08	0.09	0.12	0.14	0.17	0.21

* Ag Water Science Unit, Imperial Irrigation District.

Water and Drought Online Seminar Series

The latest research-based advice on weathering a drought is now available free online. The UC Division of Agriculture and Natural Resources is working to help farmers cope with the unwelcome outcome of historically low rainfall the last three years. UC scientists, with support from the California Department of Water Resources, have recorded video presentations on high-priority drought webpages.

Each presentation is about one half hour in length and is available at the link below:

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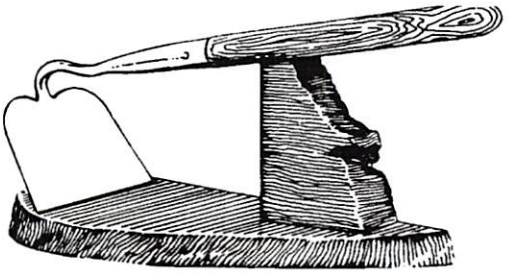
Then click on the drought resources link.Water and Drought Online Seminar Series



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