VEGETABLE CROPS HOTLINE

A newsletter for commercial vegetable growers prepared by the Purdue University Cooperative Extension Service

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<http://www.entm.purdue.edu/entomology/ext/targets/newslett.htm>

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WIREWORM DAMAGE ON CUCURBITS - (*Frankie Lam*) - During this cold summer, wireworm (Fig. 1) seems to cause more damage on our crops than in a normal year. I have seen wireworm injury in my cucumber and muskmelon studies at the Southwest Purdue Agriculture Center during mid-May. Compared with past years, the wireworm damage in this year is the worst I have seen at the Center. In my studies the wireworm number found on plants ranged from 1 to 26 with approximately 4% of the plants being killed.

Wireworms are occasional pests on cucurbits and outbreaks mainly occur under cold early season conditions. The pests feed on the roots (Fig. 1) and bore into the stem (Figs. 2 and 3) near the ground surface. They feed on the internal tissues and kill the plant. In the field if you find wilting plants and no clues of insect feeding or diseases on the aerial parts, then dig up the plant and check for wireworms. Once a field is infested by wireworms, not much can be done to cure the problem. The only thing we can do is to wait for warmer weather and replant those plants that have been killed by the worms. The decision to use insecticides for wireworm management must be made prior to planting. Not many insecticides are labeled for wireworms on cucurbits; from my experience Furadan has relatively good control of wireworms.

Fig. 1. Wireworms destroyed the root system of a cucumber transplant. *(Photo by Frankie Lam)*

Fig. 2. Wireworms bore into the stem of cucumber. *(Photo by Frankie Lam)*

Fig. 3. Wireworms feeding on the stem of muskmelon. *(Photo by Frankie Lam)*

Keep a record of wireworm history in your field and set bait traps in the field next spring before planting the crops. Please read the articles, *Wireworm Damage on Vegetables and Melons*, in *Vegetable Crops Hotline* No. 446 (April 8, 2005) on setting bait traps in field, and *Wireworm Damage on Potatoes*, in *Vegetable Crops Hotline* No. 447 (April 29, 2005) on the life history of the pest.

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Cool Temperatures May Increase Crop Sensitivity to Labeled Herbicides - *(Liz Maynard)* - The cool weather this spring means that many early-planted warm season crops have probably been stressed by cool temperatures more than usual. A number of herbicides labeled for vegetable crops include warnings not to use when the crop is or will be under stress. A stressed crop may not be able to detoxify the herbicide or outgrow its effects quickly enough. In the case of a soil-applied herbicide, the crop roots may not grow into untreated soil fast enough to avoid injury. If you are seeing some of the symptoms described below, it may be that the stress from cool temperatures has made the crop more susceptible to an herbicide that was applied before or soon after planting. At this point, there is not a lot one can do about it other than minimize any additional stress to the crop. It goes without saying that it is important to keep an extra close eye on the crop to determine whether harvest will be delayed and, if necessary, make adjustments in the marketing plan.

What type of injury might you see? Active ingredients in the dinitroaniline group, ethalfluralin (in Curbit and Strategy) and trifluralin, cause root stunting. Roots will appear stubby. Aboveground the plant will be stunted. Chloroacetamides like metolachlor (Dual) and dimethenamid (Outlook) can cause leaf malformation. Often on broadleaves the midvein is shortened or puckered, making a 'drawstring' look, or the leaf blade is crinkled. In corn these materials can prevent normal unfurling of leaves. Sulfonylureas like halosulfuron (Sandea) cause chlorosis, sometimes purpling, and sometimes leaf distortion or, in corn, improper leaf unfurling. Clomazone, which is in Command and Strategy, causes bleaching of leaves.

Even without an herbicide, chilling itself can injure sensitive crops like melons and squash. Chilled plants may wilt and develop watersoaked spots on leaves. Photos of herbicide injury on corn and soybeans: <www.btny.purdue.edu/Extension/Weeds/HerbInj/InjuryHerb1.html>.

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Winter Temperatures (2004-2005) and Insect Survival in Indiana - (*Frankie Lam and Ken Scheeringa*) - Winter temperatures have a strong impact on the survival of overwintering insects. Colonizing insect populations are closely related to the survival of the overwintering stages, which depend greatly on the weather of the past winter. Research has also demonstrated that insect pest numbers on some crops later in the season are largely determined by the size of colonizing populations during spring.

Winter temperatures affect the survival of overwintering insect populations in two ways: how cold the temperature was and how long the insects had to endure that particular cold temperature. Except for a few species we do not have models to predict the percentage of winter survival for most insects. Studies have demonstrated that the winter survival of insects, such as the bean leaf beetle and flea beetle, can be predicted by accumulating the freezing degree-days through winter. These models demonstrated that the greater the duration and intensity of cold in winter, the higher the percentage of insect mortality.

Following the methodology of these studies we can understand relatively how cold the past winter was and how great its impact on the overwintering insect populations. Normally winter is defined as December 1 through February 28; however, freezing degree days occur in November and March may affect the survival of overwintering insects. Thus, the freezing degree-days of winter temperatures in the article is accumulated from November through the end of March. The accumulated freezing degree days of winter 2004-2005 were obtained by subtracting the daily mean air temperature from 32°F, rejecting days with negative results, and then accumulating the remaining positive daily values through winter. For example, if the daily mean air temperature is 29°F, three degree-days are calculated for that day. The total number of winter days when freezing degree-days occurred is shown in the subfreezing day column (Table 1).

In the article climate normals (Table 2) are used as "standards" to compare with data from the past winter. A climate normal is the arithmetic average of observed daily values over the international standard 30-year period, currently 1971-2000 (three consecutive decades). By comparing the cumulative freezing degree-days of the past winter (2004-2005) with the climate normals (1971-2000), the past winter in the nine districts was colder than that of a normal year in Indiana. However, if we compare the subfreezing days of this past winter to the climate normals, only the day in District SE was greater than normal. If we compare the cumulative freezing degree-days and subfreezing days between the past two winters, temperatures on average in the past winter (Table 1) were not as cold as that of the winter 2003-2004 (Table 3).

Based on these weather data, we might summarize that if the insect pests have a certain stage that overwinters in Indiana, the overwintered populations in early spring would be relatively similar to or slight higher than that of last spring. On the other hand, if the insect pest has more than one generation per year in Indiana, it is difficult to predict the relative numbers of the subsequent generations with this hypothesis. This is because the size of subsequent populations will also be greatly affected by the weather in spring and early summer.

Table 1. Accumulated freezing degree days and number of subfreezing days of the nine Indiana agricultural statistics districts in winter 2004-2005.

District	Winter 2004-2005						Subfreezing days
	Accumulated Freezing Degree Days (^{0}F)						
	Nov	Dec	Jan	Feb	Mar	Total	
NW	2	197	275	68	64	606	65
NC	1	200	292	83	80	656	68
NE	0	205	298	106	88	697	71
WC	0	192	210	42	41	485	57
C	0	193	218	40	50	501	56
EC	0	200	250	62	66	578	63
SW	0	144	97	2	4	247	30
SC	0	145	110	3	10	268	33
SE	0	145	140	5	20	310	41

Table 2. Accumulated freezing degree days and number of subfreezing days of the nine Indiana agricultural statistics districts during winters 1971-2000 (climate normals).

District	Climate Normals (1971-2000)						Subfreezing days
	Accumulated Freezing Degree Days (^{0}F)						
	Nov	Dec	Jan	Feb	Mar	Total	
NW	0	112	270	118	0	500	82
NC	0	97	255	114	0	466	80
NE	0	99	259	129	0	487	83
WC	0	57	191	51	0	299	66
C	0	49	177	52	0	278	66
EC	0	62	202	74	0	338	71
SW	0	2	52	0	0	54	33
SC	0	5	57	2	0	64	38
SE	0	3	54	2	0	59	36

Table 3. Accumulated freezing degree days and number of subfreezing days of the nine Indiana agricultural statistics districts in winter 2003-2004.

District	Winter 2003-2004						Subfreezing days
	Accumulated Freezing Degree Days (^{0}F)						
	Nov	Dec	Jan	Feb	Mar	Total	
NW	8	89	372	185	12	666	71
NC	7	85	392	193	21	698	74
NE	7	85	407	195	26	720	77
WC	4	74	310	141	7	536	61
C	4	70	312	127	9	522	65
EC	5	73	338	135	14	565	70
SW	0	30	179	50	0	259	40
SC	0	34	194	51	0	279	48
SE	0	38	225	57	3	323	52

Food Safety Resources Still Available - *(Liz Maynard)* - Haven't requested your free Handwashing Poster, Farmworker Training Video, or Good Agricultural Practices Farm Assessment book yet? Still trying to decide when or whether to schedule a free on-farm consultation about food safety? It's not too late! IVGA members, watch your mail for an order form. Other Indiana growers, call (219) 785-5673 to request an order form and more information about the Ohio and Indiana Specialty Crop Food Safety Initiative. Or follow the link from the Fruit and Vegetable Connection Web site <www.hort.purdue.edu/fruitveg>.

Purdue Workshops Explore Expanding AG Specialty Markets - *(Timi Jo Jordan)* - Two one-day workshops will offer insights on the trends, market requirements and marketing tools needed to help break into agricultural specialty markets.

The workshops, co-sponsored by the Purdue University Cooperative Extension Service, will take place June 10 at the Purdue Extension office in Noblesville, IN and Aug. 5 at the Clark County 4-H Center in Charlestown, IN. "We are combining tools and practical experience from people who are actually in the market, and that's a great way to offer a program," said Corinne Alexander, agricultural economist and workshop coordinator

Workshop topics include:

- Production and marketing alternatives for horticulture crops, such as direct marketing, agritourism greenhouse operations, organics and season extension.

Registration for each workshop begins at 8 a.m.; with sessions running from 8:30 a.m. to 3:30 p.m. Early registration is $15 if received by May 27 for the Noblesville workshop and by July 22 for the Charlestown workshop. After the early registration deadlines, the cost is $20. The registration fee includes lunch and snacks. To register, contact Patt Sheahan at (765) 494-4310, shehanp@purdue.edu. The workshops are partially funded by a grant from the U.S. Department of Agriculture's Risk Management Agency. For more information on the workshops, contact Alexander at (765) 494-4249, cealexan@purdue.edu. A <www.agecon.purdue.edu/pdf/SFT_brochure.pdf> is available online. The Purdue Small Farms and Sustainable Agriculture Team, Purdue's Department of Agricultural Economics, Purdue Extension and the USDA-RMA are co-sponsors.

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