Section II
Foliage & Seed-feeding & Mining Insects

CABBAGE SEEDPOD WEEVIL MONITORING SYSTEMS

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We continued with studies initiated last year to evaluate monitoring systems for the cabbage seedpod weevil (CSPW), *Ceutorhynchus assimilis* Paykull, in winter rapeseed. Colored sticky-traps have been used since 1977 to monitor weevil flights into the fields. John Deere Yellow has been the standard color used to date. This choice of color was based on the knowledge that the weevils were attracted to the rapeseed fields by the crop's yellow flowers. Based on last year's experiments any yellow color is considered to be highly attractive to the CSPW. We also noted last year that non-yellow colors such as white might also be useful; while they were less attractive then the yellow traps, they provided similiar information relative to CSPW activity and seasonal phenology. We also conducted some preliminary studies last year to evaluate a non-sticky, impact trap that might be easier and less messy to use than sticky traps. With this in mind, we undertook some follow-up studies this year to further evaluate yellow and white colored sticky traps and two other trap types; a commerically available yellow sticky board that is currently used for monitoring the apple maggot and a yellow non-sticky, impact trap, which is currently used to monitor Japanese beetle populations.

Another concern that we have had is trap placement with respect to the crop. Historically, the traps have been placed within 1.5 m of the crop. There was no sound basis for this decision other than that it seemed like a reasonable place to put the trap. We really had no idea how trap placement would affect CSPW trap catches or how those catches related to what was happening in the field. So, this year we set the traps (all trap types) at locations adjacent to and 10 m from the crop. We also used sweep-net sampling at the crop edge and 10 m and 20 m into the crop to evaluate beetle populations in the field so that we could then relate trap catches to in-field populations.

The white and yellow pole traps consisted of five #10 cans mounted on a wooden post at about 33 cm intervals starting at 30 cm from the ground. All cans on a post were painted the same color (as was the post). The apple maggot and Japanese beetle traps were bought from commercial sources. A trap-line containing each of the traps was placed at the border and 10 m away from each of four fields. Individual traps in a trap-line were separated from one another by 20 m. Each trap-line was set in a north-south orientation to avoid problems with pervailing westerly winds. All traps were monitored weekly.

The effect of trap type and location on weevil catches is summarized in Table 1. Note that yellow pole traps were more attractive to the weevils than white pole traps. Weekly catches for the white pole traps were correlated to those of the yellow pole traps although the degree of correlation depended on trap placement (corrrelations ranged from 0.60 - 0.79) indicating that while the non-yellow trap was less attractive, it showed similar seasonal trends in terms of weevil catches.

Trap catches in Japanese beetle and apple maggot traps were generally highly correlated to the yellow and white pole traps irrespective of trap location (correlations ranged from 0.67 - 0.92) indicating that they too provided similar information with regard to seasonal population trends. It should be noted that one reason for evaluating these alternative trapping systems was that the sticky pole traps are messy

and somewhat difficult to work with. However, each of the alternative traps has its own set of disadvantages. The Japanese beetle traps were cleaner, but such large numbers of weevils were caught that the processing of the traps became a problem (note that trap catches were as high as 5,000 weevils per week). The apple maggot traps were generally easier to monitor than the pole traps, but there were times when these traps were literally overwhelmed by the beetle flights; every available exposed surface of the traps was covered by beetles.

As mentioned earlier, we also sampled weevil populations in the crop to evaluate how the trap catches reflected what was happening in the field. There was a border effect relative to CSPW population estimates with the sweep-net. Collections from sweep-net samples at the field edge usually were higher than those from 10 and 20 m into the field. In general, all trap catches correlated well with the border sweep samples (correlations ranged from 0.77 - 0.96) irrespective of their location. Trap catches were also well correlated with sweep-net samples 10 and 20 m within the crop. The exception was the white pole traps located adjacent to the crop; correlations between trap catches and the 10 and 20 m sweep samples were not statistically significant at the 5% level. So while white pole trap catches were well correlated with the other pole traps, they did not necessarily correlate well with the seasonal sweep-net catches within the field.

Future Plans:

Development of an appropriate monitoring system for the cabbage seedpod weevil will continue for one more season. This year's study will be replicated next year so that year to year variation can be evaluated. Also, concurrently we will initiate studies to evaluate the relationship of weevil catches to yield responses in winter rapeseed. The overall goal is to develop economic injury and threshold levels for this key pest of rapeseed.

Table 1. Cabbage Seedpod Weevil (CSPW), Catches for Various Trap Types and Trap Locations and Sweep Net Samples During 1987[1].

Date	x̄ CSPW/Trap								x̄ CSPW/Sweep		
	YPOLE1	YPOLE2	WPOLE 1	WPOLE2	MAG1	MAG2	JAP1	JAP2	0 m	10 m	20 m
4/13	0.03	0.00	0.00	0.00	0.00	0.00	0.33	1.00	0	0	0
4/16	0.12	0.07	0.00	0.00	0.33	0.00	1.67	0.33	0.33	0	0
4/21	35.14	22.69	0.15	0.06	70.37	42.12	103.25	149.75	20.25	17	25.75
4/28	228.54	208.76	4.12	1.26	317.12	369.37	3157.75	3000.25	88.25	92.5	87
5/5	229.41	224.47	6.53	2.36	425.5	600.75	3599.25	4524.25	188.75	110	132.25
5/13	195.60	208.28	30.06	5.04	600.75	660.12	3850.00	5770.00	186.25	60.25	64.25
5/18	149.45	81.40	6.75	1.73	474.37	287.12	2377.50	1807.50	80.5	55.75	42
5/26	69.00	48.01	3.37	1.26	461.25	344.12	2610.00	2187.50	52.25	31.25	27
6/13	22.3	23.60	1.01	0.46	205.37	173.00	1080.00	812.00	41.75	18.5	17.75
6/10	20.45	19.34	1.50	0.29	389.75	274.12	2160.00	1720.25	41	20.25	12.75
6/16	15.35	9.12	1.14	0.25	178.5	87.62	887.50	473.75	11.5	2.5	3

1/YPole1 = Yellow pole trap adjacent to crop; YPole2 = Yellow pole trap 10 m from crop.
WPole1 = White pole trap adjacent to crop; WPole2 = White pole trap 10 m from crop
Mag1 = Apple maggot trap adjacent to crop; Mag2 = Apple maggot trap 10 m from crop.
Jap1 = Japanese beetle trap adjacent to crop; Jap2 = Japanese beetle trap 10 m from crop.

Table 2. Correlation Coefficients and Associated P Values (P) of Mean Seasonal CSPW Trap and Sweep-net Catches During 1987[1].

	YPOLE1	YPOLE2	WPOLE1	WPOLE2	MAG1	MAG2	JAP1	JAP2	0 m	10 m	20 m
YPOLE1	1.00000	0.97381	0.59510	0.75381	0.71326	0.86313	0.86739	0.86041	0.88411	0.96818	0.93044
	(0.0000)	(0.0001)	0.0534)	(0.0074)	(0.0137)	(0.0006)	(0.0005)	(0.0007)	(0.0003)	(0.0001)	(0.0001)
YPOLE2	0.97381	1.00000	0.65393	0.79074	0.67548	0.89322	0.86331	0.90903	0.91948	0.94382	0.93661
	(0.0001)	(0.0000)	(0.0291)	(0.0039)	(0.0225)	(0.0002)	(0.0006)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
WPOLE1	0.59510	0.65393	1.00000	0.96179	0.68948	0.75374	0.66596	0.82622	0.77054	0.43294	0.42162
	(0.0534)	(0.0291)	(0.0000)	(0.0001)	(0.0189)	(0.0074)	(0.0253)	(0.0017)	(0.0055)	(0.1835)	(0.1965)
WPOLE2	0.75381	0.79074	0.96179	1.00000	0.79568	0.88235	0.80755	0.92635	0.89889	0.63100	0.61967
	(0.0074)	(0.0038)	(0.0001)	(0.0000)	(0.0034)	(0.0003)	(0.0026)	(0.0001)	(0.0002)	(0.0374)	(0.0420)
MAG1	0.71326	0.67548	0.68948	0.79568	1.00000	0.89783	0.93843	0.85148	0.78593	0.67007	0.58402
	(0.0137)	(0.0225)	(0.0189)	(0.0034)	(0.0000)	(0.002)	(0.0001)	(0.0009)	(0.0041)	(0.0241)	(0.0592)
MAG2	0.86313	0.89322	0.75374	0.88235	0.89783	1.00000	0.97316	0.98697	0.95848	0.84113	0.82115
	(0.0006)	(0.0002)	(0.0074)	(0.0003)	(0.0002)	(0.0000)	(0.0001)	(0.0001)	(0.001)	(0.0012)	(0.0019)
JAP1	0.86739	0.86331	0.66596	0.80755	0.93843	0.97316	1.00000	0.94004	0.88680	0.84934	0.78884
	(0.0005)	(0.0006)	(0.0253)	(0.0026)	(0.0001)	(0.0001)	(0.0000)	(0.0001)	(0.0003)	(0.0009)	(0.0039)
JAP2	0.86041	0.90903	0.82622	0.92635	0.85148	0.98697	0.94004	1.00000	0.96528	0.81120	0.80242
	(0.0007)	(0.0001)	(0.0017)	(0.0001)	(0.0009)	(0.0001)	(0.0001)	(0.0000)	(0.0001)	(0.0024)	(0.0030)

1/YPole1 = Yellow pole trap adjacent to crop; YPole2 = Yellow pole trap 10 m from crop.
WPole1 = White pole trap adjacent to crop; WPole2 = White pole trap 10 m from crop
Mag1 = Apple maggot trap adjacent to crop; Mag2 = Apple maggot trap 10 m from crop.
Jap1 = Japanese beetle trap adjacent to crop; Jap2 = Japanese beetle trap 10 m from crop.
0 m = Sweep samples at field border; 10 m & 20 m = Sweep samples at 10 and 20 m into crop, respectively.