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In This Issue

Insects, Mites, and Nematodes

- European Corn Borer Threat Has Changed...So Have We
- 2005 Western Corn Rootworm Soybean Sweep Net Survey
- Winter Annual Weed and Management of Soybean Cyst Nematode

2005 Pest&Crop Survey is now available. Please take a few minutes to complete the survey. This helps us evaluate if we are meeting your needs. Click here to complete the on-line survey and thank you!

Insects, Mites, And Nematodes

European Corn Borer Threat Has Changed…So Have We – (*John Obermeyer, Christian Krupke, and Larry Bledsoe*)

- Long-time survey has been discontinued.
- First generation corn borer is likely diluted among many early-planted fields.
- Unpredictable second/third brood causes significantly more damage.
- Economics speak favorably for Bt-corn borer, especially when not planting early.

Since 1961, Purdue University Entomology has conducted an annual European corn borer survey early in the fall that has been reported in the *Pest&Crop* for many years. Results of the survey were a "post-mortem" look at corn borer activity during the season and offered foresight into the potential risk to next-year's corn from overwintering larvae (next year's stock). Obviously, the intent of this information was to keep producers informed about this pest and help in identifying management strategies. Awareness was high after Bt-corn borer varieties were commercially available and producers needed to consider the added technology costs with the anticipated corn borer threat.

European corn borer generally has two distinct generations, although in some years there is a partial third. First brood corn borer, from overwintering larvae, are generally attracted to, and have greatest survival on the tallest, greenest corn – normally this is early-planted corn. While comparing fourteen years of survey data, first generation damage represented only 25% of the total damage (stalk tunneling). Scouting and treating for first generation European corn borer was a common practice in the 1970's and 80's. Recent survey data and conversations with pest managers have indicated that the first brood threat has declined in commercial cornfields. What has changed? Perhaps the answer is as simple as planting date coupled with improved hybrid performance. There is no question that today's planting pace far exceeds what was accomplished two decades ago, coupled with better hybrid vigor allowing plants to withstand early harsh environments. In other words, first brood corn borer moths are diluted out among many early-planted and lush fields keeping infestations sub-economic.

Predicting next year's second generation populations and damage from this survey data has always been impossible due to an extensive list of variables that affect

corn borer survival throughout next year's growing season. We understand the pest's behavior enough to know that the later flights are most attracted to actively pollinating, late-planted or late-maturing corn. We also know from years of survey data that this brood, and perhaps some third generation flights, accounts for three-quarters of the stalk damage found at the end of the season. But treating commercial corn late in the season for this pest is generally unsuccessful, if attempted at all.

One does not need reams of data to state that European corn borer populations and subsequent damage varies from year to year. Applying simple economic calculations to survey data from 1995 to 2004 reveals that on average $6.13 was lost per acre from European corn borer damage (range $1.85 to 8.86). Bt-corn borer has dramatically improved in yield performance since commercialization in 1996. In addition, at least for the Eastern Corn Belt, technology fees are reportedly minimal for those buying significant quantities. With marketing and non-agronomic issues aside, producers seem astute in considering this technology in any corn planted beyond the "early" window. Obviously, we advocate an understanding and following of planting non-Bt corn refuge as EPA requires.

For the reasons discussed above and the staff-hours required, we have decided to conclude the fall overwintering survey. Continuing the survey purely for historical purposes was not enough of a justification. Just as with other insect pests in Indiana's field crops, we will continue to keep you abreast of European corn borer threats when populations surge. This will be accomplished by monitoring moth flights to better help pest managers time their scouting trips. Should things change, we may revisit and revise the fall survey. If so, you will see it first in the *Pest&Crop*.

2005 Western Corn Rootworm Soybean Sweep Net Survey – (*John Obermeyer, Christian Krupke, and Larry Bledsoe*)

- Survey numbers indicate relative abundance of beetles in areas.
- Risks to first-year corn are determined by combining years of survey data with actual damage.
- Repeated monitoring with sticky cards is only way to assess risk of individual fields.
- Soybean aphid treatments did NOT prevent beetles from laying eggs in soybean before and after.

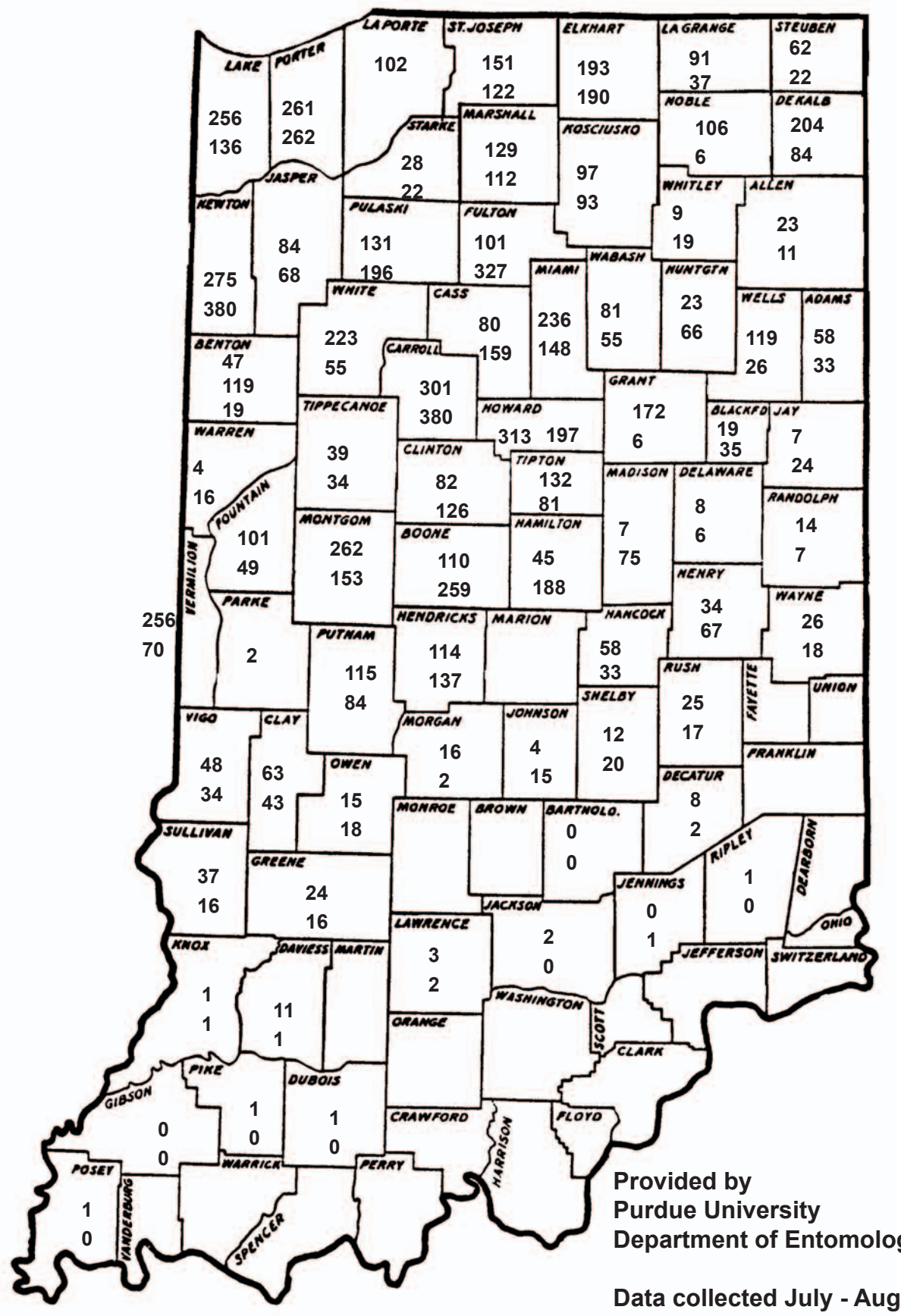
Once again many of Indiana counties were visited in late summer to obtain a snapshot of the distribution and abundance of western corn rootworm adults in soybean during a critical period of rootworm egg deposition. Finding an insecticide-free field to sample became quite a challenge in some northern Indiana counties as many fields were treated for soybean aphid.

The relative abundance of rootworm adults found in soybean in 2005 provides regional estimates of the risk of root injury to 2006 first-year corn. The state map on the following page shows the total number of adult western corn rootworm beetles captured in 100 sweeps/field (five sets of twenty sweeps) using a 15-inch diameter net. You will note numerical differences within counties or between adjoining counties, and these are a result of our limited sampling - two data points/county are not sufficient to compare risks on a county basis. Similarly, these "one-time visit" numbers should not be used to infer infestation risks for particular fields. Sweep samples are best viewed as a guideline to assess whether areas are in high, moderate or low risk areas. All growers, especially those in moderate to low risk areas, are encouraged to assess individual fields to refine treatment decisions in first-year corn. This is best accomplished by visiting the field multiple times during the beetle's egg-laying period (mid-July to mid_August) while strategically placing multiple yellow sticky traps. See the on-line publication "Monitoring and Decision Rules for Western Corn Rootworm Beetles in Soybean" at <www.entm.purdue.edu/Entomology/ext/targets/e-series/EseriesPDF/E-218.htm>.

There has been no demonstrated correlation between soybean sweep counts of beetles and crop injury in corn the following season. In addition, in the springtime, there are many interconnected affecting larval survival and root vulnerability, all of which contribute to the difficulties in assessing the year-to-year economic risks. However, empirical observations over many years, have allowed us to estimate regional risk levels using these sweep sample data as a guide. The primary goals of the annual survey are to compare regional risks of infestation over several years and assign general risk levels of injury to the subsequent crop by areas of Indiana.

As previously mentioned, it was a challenge to conduct this random survey in areas of the state where most soybean fields were treated for aphids. Occasionally we resorted to sampling fields that had been treated, based on visual evidence (wheel tracks). However, from the beetle numbers in these sweeps, it was obvious it took little time for western corn rootworm beetles to re-infest fields after insecticide applications. The variant beetle is biologically driven to enter soybean fields and lay eggs, and producers have NOT eliminated their risk of first-year corn damage by treating soybean fields with insecticides this year. As proof, a recent five year, Illinois/Indiana joint program failed to eliminate first-year corn damage even when fields were monitored weekly and treated as many as three times a season.

2005 Western Corn Rootworm Sweep Net Survey in Soybean (Number/100 Sweeps)



Provided by
Purdue University
Department of Entomology

Data collected July - August, 2005

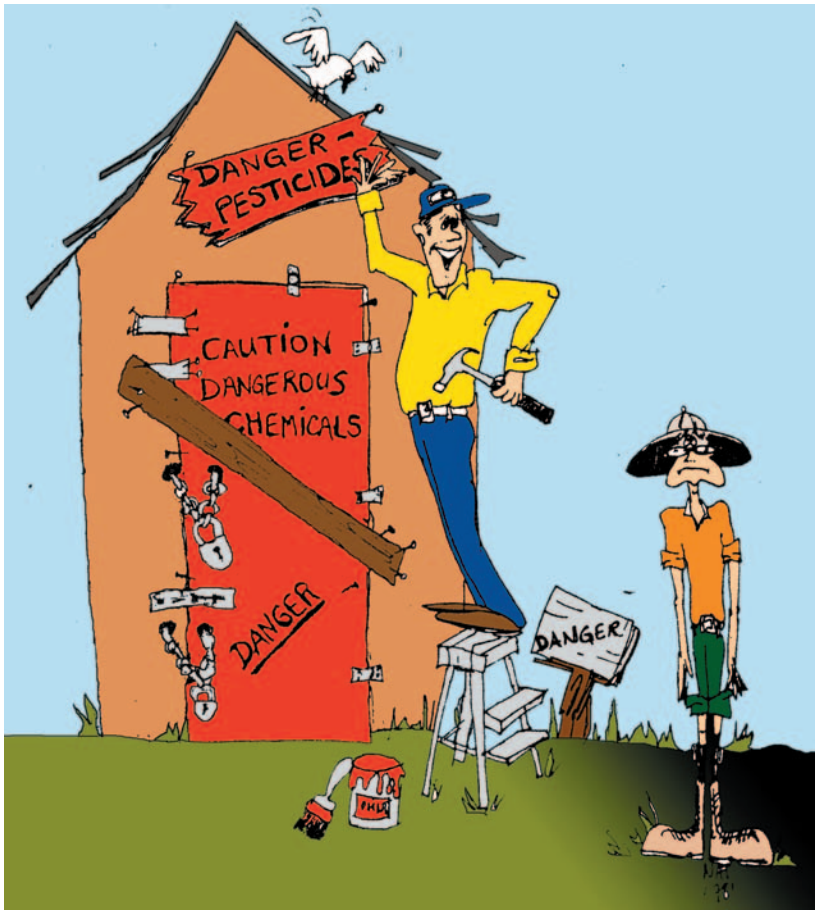
Special thanks to Frankie Lam, SW Indiana IPM Specialist, Todd Hutson, Vermillion Co. CES, and Steve Barry, Fulton-Marshall Co-op, in their assistance with this survey.

Winter Annual Weeds and Management of Soybean Cyst Nematode – *(Jamal Faghihi, Bill Johnson, and Virginia Ferris)*

Once again winter weeds like Henbit and Purple deadnettle are beginning to show up in fields around Indiana. These two winter weeds are particularly susceptible to soybean cyst nematode. For the most part, the active growth period for these weeds does not coincide with SCN activities. SCN is not physically active when soil temperature falls below 50°F. The optimum temperature for soybean cyst nematode is 75°F. At 75°F the nematodes require about one month to complete one life cycle, about 750 degree days. This has been a dry summer and fall so far. An earlier than usual harvest might encourage earlier winter weed activities. The higher temperatures that we experienced in September and October might cause a completion of the SCN life cycle this fall. For the first time, we were able to document and report the completion of at least one generation of SCN in the field last spring. Mr. Earl Creech, the graduate student working on this project, was able to follow a life cycle of SCN and extract newly developed cysts on roots of Purple deadnettle plants in a field in southern Indiana.

The winter annuals in Indiana typically germinate in late fall and mature in early spring. During this time period, under normal conditions, the Indiana soil temperature seldom reaches and stays at the required temperature. Fall's weather conditions this year have been relatively warm. With well established winter weeds and warm temperatures this year, having the required soil temperatures to complete a life cycle is a possibility. Thus growers might have an extra incentive to spray for winter weeds this fall as part of their overall farm management and SCN population control if they have fields with both purple deadnettle and SCN. With funding from the Indiana Soybean Board and USDA CSREES we are continuing to pursue the correlation between winter weeds and soybean cyst nematode. We have yet to accumulate enough data to be able to recommend winter weed management on regular basis to manage SCN in the northern half of the state, but we are getting close to more definitive answers. We might be able to predict the activities of SCN on winter weeds based on the number of degree days required for SCN to complete the life cycle (750 DD). The accumulation of DD in southern and northern Indiana will be different in different years. We might have to have two sets of recommendations for different parts of the state. We will monitor SCN and winter annuals activities and correlate them with soil temperatures to be able to make better recommendations in the future.

Bug Scout



"Now my soybean rust fungicides are safe until I need them!"