

BMP CHALLENGE™: Guaranteeing Performance of Corn Rootworm IPM for Corn Producers and Advisors

Thomas Green, Ph.D., IPM Institute of North America; Brian Brandt, American Farmland Trust – Agricultural Conservation Innovation Center; Thomas and Stanley Buman, Agren Inc.



"We've used a crop consultant in the past, but if he's wrong, the cost is much more than the cost of the pesticide." - Iowa corn producer

Economic Risk as a Barrier to IPM Adoption

Historically, producers have over-applied pesticides and fertilizers as an "insurance" strategy to guaranty maximum yields. More than TWENTY STUDIES over the past thirty years cite risk as a major barrier to Best Management Practice (BMP) adoption, including reports from the National Academy of Sciences, the US General Accounting Office and the USDA Economic Research Service.

BMPs, including Integrated Pest Management (IPM) techniques, improve farm profits and reduce pollution. Potential BMP savings to producers are at least \$8 billion annually. BMPs are not adopted universally, however, in large part due to risk. BMPs can reduce yields in years when rare and unpredictable weather events occur. Many producers will not accept those occasional losses, even though BMPs will save them money over time.



AGFLEX Role

Agflex is a new Iowa corporation formed to administer guarantees for IPM and other BMPs. AGFLEX developed from a multi-party collaboration including Agren, American Farmland Trust, the IPM Institute and IPM Works LLC, with funding from state and federal agencies and private foundations. Agflex contracts with producers and advisors to cover the risk, makes payments if necessary and maintains reserves to cover "worst case" scenarios.

Why Economic Protection for Corn Rootworm IPM?

IPM techniques, recommended by university experts, Extension and state agencies, are designed to maximize economic returns to producers over time, but in any one year they may result in lower yields. Corn rootworm scouting fails from 5% to 16% of the time (E. Raun, NE crop advisor and J. Stute, University of Wisconsin Extension, personal communications). Scouting can reduce control costs by up to \$18 per acre on below-threshold fields.

In large part due to the risk of lower yields and downed corn, corn is not being scouted for corn rootworm. This is especially true in areas where the variant Western corn rootworm is depositing eggs in soybean, defeating rotation as a management strategy. Crop insurance deductibles are too high to cover most rootworm-related losses. Downed, or lodged corn, can often be harvested but at much slower speeds, thus costing producers valuable time during the critical harvest season.

The BMP CHALLENGE™ program allows corn producers to try IPM and other BMPs on their own acreage and observe results first hand, without risk of yield loss.



How the Corn Rootworm IPM Guarantee Works

STEP 1:

- Traps are placed in corn or soybeans, or beetles are counted on corn plants, in late July through early September.
- Weekly counts are taken for 4-6 weeks.
- If the field remains below a threshold of 5 beetles per trap per day on average, the field can be enrolled in the guarantee program.



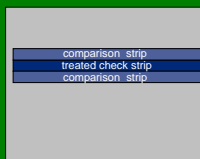
STEP 2:

- The crop advisor sets out a "check" or comparison strip, which is treated for corn rootworm using a soil insecticide or a genetically modified variety containing a plant-incorporated pesticide.
- The check strip is 40' to 60' wide, and runs the length of the field.
- The remainder of the field is untreated



STEP 3:

- At maturity, the producer and crop advisor harvest one pass through the check strip, and one through an immediately adjacent strip, using a yield monitor or weigh wagon to compare results.
- If the BMP portion yields less than the check strip, the crop advisor prepares a net returns analysis.
- This calculation figures the value of the crop loss vs. the savings in treatment costs, and also factors in any additional time required to harvest lodged corn.



At harvest, yield from the treated check strip (dark blue) is compared to yield from adjacent untreated strips.

STEP 4:

- If the net returns analysis indicates a net loss, the producer receives a payment from Agflex to make up the difference.
- Thus the producer ends up with the same returns as if he or she had treated the entire field.

Results

Of the eight fields that scouted below threshold, two experienced greater than predicted root damage, i.e., the threshold of five beetles per trap per day predicts a root rating of 0.75 or less. Four were scouted as soybean fields (variant CRW, fields #3-6) and four were corn fields. There was a strong trend towards less root damage and greater yields in the treated check strips, with an average yield increase of 6.6 bushels. After deducting control costs, average guarantee payments to producers were \$6.66 per acre. We did not experience any lodged corn and thus made no payments for additional harvest time. Additional fields will be enrolled in 2005-2006.

| Field # | Mean root rating | | Yield diff in check (bu) | CRW trt costs | Payout /acre |
|---------|------------------|---------|--------------------------|---------------|--------------|
| | Untreated | Treated | | | |
| 1 | 0.06 | 0.07 | +2.0 | \$18.00 | \$0.00 |
| 2 | 0.29 | 0.00 | +2.0 | 18.00 | 0.00 |
| 3 | 0.36 | 0.21 | +10.8 | 13.36 | 13.20 |
| 4 | 1.05 | 0.29 | +2.1 | 13.86 | 0.00 |
| 5 | 0.16 | 0.07 | +3.6 | 8.91 | 4.57 |
| 6 | 0.14 | 0.11 | +5.6 | 10.40 | 3.32 |
| 7 | 0.05 | 0.04 | +17.6 | 16.72 | 26.50 |
| 8 | 1.09 | 0.07 | +9.1 | 16.72 | 5.70 |
| Avg | 0.40 | 0.11 | +6.6 | \$14.50 | \$6.66 |
| SD | 0.43 | 0.10 | 5.6 | \$3.47 | \$9.15 |

Opportunities and Challenges

Corn is not scouted for corn rootworm over an increasingly large geographic region. The following barriers need to be addressed:

- A more convenient monitoring system. Four to six trips to check and replace traps, or count beetles on plants, is too many.
- Incorporating cost of control and value of the crop would improve the accuracy of the threshold. The new North Central regional nitrogen recommendation system for corn is a model for this improvement.
- Yield boost from PIP corn varieties, and cumulative impacts from drought or other stresses need to be factored into the threshold.
- Regional differences in pressure impact benefit by changing ratio of under to over-threshold fields. A geographic information system similar to the soybean rust system could help identify where scouting is most likely to deliver economic benefits.

SCOUTED ACRES WANTED!
Nutrient reduction and conservation tillage risk protection programs are also available. Contact us at (608) 232-1528, or ipmworks@ipminstitute.org for more information. www.bmpchallenge.org

Acknowledgements: Thanks to Marlin Rice and USDA ARS Image Gallery for photos. Funding and other support have been provided by the Altria Group, Iowa Department of Economic Development, the Great Lakes Protection Fund, Joyce Foundation, LeSueur County Environmental Services, Macon County Soil & Water Conservation District (IL), McKnight Foundation, Minnesota Department of Agriculture, National Fish and Wildlife Foundation, National Foundation for IPM Education, Ohio State Extension, Seven Mile Creek Watershed Project, U.S. EPA Pesticide Environmental Stewardship Program, University of Wisconsin, Wisconsin Department of Natural Resources, USDA North Central Region IPM Center, USDA CSREES Small Business Innovative Research Program, USDA Natural Resources Conservation Service and USDA Risk Management Agency and others.