

Crop Insect Losses and Impact Assessment Working Group

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Progress Summary

Impact assessment is central to the evolution and evaluation of our IPM programs. Quantifiable metrics on insecticide use patterns, costs, targets, and frequency, crop losses due to all stressors of yield and quality, and other real world economic data (e.g., crop value) are our most objective tools for assessing change in our systems. Our past efforts have been organized around cotton, melons, and leafy vegetables in AZ. This project has enabled us to formalize and extend this process to the low deserts of CA and is beginning to serve as a model for establishing similar efforts in other crops, for other pest groups, and in other regions.

In our first year, we developed a presentation that establishes the incentives for participation, explains the crop insect loss system, and walks the participants through the estimation process. This interactive session was performed at three locations, one in central Arizona and two along the river between Arizona and California (Yuma, AZ and Blythe, CA) for cotton [in collaboration with M. Rethwisch (UC)]. Nearly 40 stakeholders attended these sessions, of which about 19 were compensated for their travel costs to these sessions (21 declined compensation). Of about 238,000 acres of cotton in Arizona, over one third was directly represented in these sessions by the pest control advisors responsible for prescriptive use of insecticides for that acreage (ca. 85,000 A). Data are still being summarized, but between half and two thirds of the CA cotton acreage in Imperial Valley and Palo Verde Valley were covered by these estimates. In addition, other industry and University (Cooperative Extension) personnel provided estimates of insect losses over all acreage in their respective areas.

The result is the most robust dataset on cotton insect losses ever. Stakeholder feedback about the process was uniformly positive and reflected a desire to continue in this process each year. The cotton data represents a new benchmark for the California desert regions that would otherwise be represented, if not overwhelmed, by the much larger central valley (SJV) cotton production. As such, we do not have a basis of historical comparison for the low desert CA production. However, the AZ data reveals that 2004 experienced some of the lowest insecticide use in 25 years, second only to 1999. On average, AZ cotton was sprayed less than three times for all insect (arthropod) pests (2.683 foliar intensity) and lost just over 5% in yields to arthropods. Losses and foliar intensity were lower (by 39.2% and 46.9%, respectively) for Bt cottons versus non-Bt cottons. When considering total arthropod management costs and losses, users of Bt cotton saved almost \$27/A or ca. \$19 million statewide in 2004.

The Arizona Pest Management Center (APMC) serves as the hub on which this working group and activity are formed. Our Program Coordinator (JJ) left the UA for a position at U. of Wyoming. However, a major commitment on the part of the APMC and of this working group was the recruitment of an IPM Program Manager. Al Fournier of Purdue

University will be joining our effort and will become integrally involved with the conduct of this working group.

In collaboration with scientists and stakeholders throughout the low desert areas of AZ and southern CA, we have provided a forum for discussion and development of crop insect loss and impact assessment in key economic crops of this region. Our model process was deployed for cotton and our Vegetable Insect Losses coordinator (JP) will continue efforts to adapt this process to the high value crops of head lettuce and cantaloupe (spring and fall crops). Once fully established and with a historical base of data, we will serve as a clearinghouse for developed information and metrics on crop insect loss and impact assessment for the benefit of assessments of other pest groups and in new areas of the West and beyond. By providing direct incentives to meeting participants, we have ensured work group participation and greatly increased the quality of this type of data and its relevance to real-world practices. We will continue to assemble groups around common crop themes (e.g., cotton, melons, leafy vegetables) with appropriate subject matter experts for the purpose of discussion of the crop insect loss evaluation process and the development of real world data in this area.

These data and this Working Group serve to address any Federal, regional, state, or local requests for information on the impact of insects or insecticides on our key crops. We had numerous informal requests for information in 2004, and one formal request by the Arizona Cotton Growers Association to present comparative data on Bt versus non-Bt cottons.

What makes these data one of a kind with respect to pesticide (and IPM) policy is that we are directly measuring the "intent" of each insecticide input. That is, stakeholders are asked to identify the specific intent or intended target or targets of their management decisions and inputs. For example, a pest manager might elect to spray compound X with a written prescription for pest A; however, through this dialog, we might learn that this pest manager intended to directly control pest B, C, and D in addition to A. Therefore, the apportionment of that spray might be 0.7 "sprays" towards A and 0.1 against each of B, C, and D. So in addition to the rich quantitative data collected in this exercise, we also have unique qualitative insights into the decision-making experience of the pest manager. These insights will help guide our existing and new programs of research, implementation and IPM outreach.

Relevant Literature

Ellsworth, P.C. and J.S. Jones. 2000. Arizona Cotton Insect Losses. Publ. No. AZ1183. University of Arizona, College of Agriculture and Life Sciences, Cooperative Extension, Tucson, Arizona. URL: <http://cals.arizona.edu/crops/cotton/insects/cil/cil.html>