NYS IPM Project Annual Report

Project Title
  Develop Smartphone and Tablet-based monitoring application to assess and map,   monitor and assess
  field crop health and invasive species presences.

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Executive Summary

  There are many pests and diseases that can lower yield and quality of field crops in NY.
  Monitoring and tracking these threats is a very important aspect of integrated pest management
  (IPM). Tracking can help us see trends with pest infestations across the state. One example is
  that we have been tracking a new pest, western bean cutworm (WBC) in NY for several years
  now. Certain areas of the state have increased dramatically in the level of infestation while its
  range has also increased. Northern corn leaf blight is another of several examples. Both, the
  severity and distribution of this disease has increased across the state for several years now.
  By using a scouting app for a smartphone or tablet that allows you to record the pest/disease
  presence and will benefit the producer and Cornell University by providing current impact data
  and historical documentation of records/trends from year to year. A scouting app has been
  developed to assist with the weekly collection of WBC trap information to improve the
  efficiency and consistency of data collection. A Field Crop IPM Reporting app has also been
  developed to address insect pests, diseases, vertebrate pests, and weed impacts on alfalfa, corn,
  small grains, and soybeans. Additionally, tools are under development to assist with the
  interpretation and visualization of the data. Adaptation of these app and tools for application to
  other pests and diseases is under consideration.

Issue

  Field crops (corn, alfalfa, small grains, and soybeans) consist of 90% of all tillable acres
  (3,700,000) in NY. There are many pests that can lower yield and quality of field crops in NY.
  Monitoring and tracking crop pests is a very important aspect of integrated pest management
  (IPM). Scouting helps producer's make educated decisions for on management options.
  Tracking can help us see trends with pest infestations across the state. One example is that we
  have been tracking a new pest, western bean cutworm in NY for several years now. Certain
  areas of the state have increased dramatically while its range has also increased. Northern
  corn leaf blight is another of several examples. The severity and distribution of this disease
  have increased across the state for several years now. By using a scouting app for a
  smartphone or tablet that allows you to record the presence and impact of pests/diseases while
  in the field, will benefit the producer and Cornell University.

Progress Summary

Developed applications, based on input from the data collectors and data users, provide an interface that simplifies and standardizes tracking input. All data collected is geospatial referenced using the embedded GPS capabilities of smartphones and tablets. Data is available for visualization, manipulation, and editing within the ArcGIS Online system. All applications developed are functional on iOS and Android systems.

The WBC application supports a two-step process which involves obtaining repetitive data at the initial site visit, thereby reducing data needs for subsequent weekly visits. By utilizing data from the initial site visit, including GPS locations, and providing drop-down menus when possible, input data is standardized.

Another application has targeted Field Crop IPM Reporting of crop pests and diseases. The purpose of this application required the development of a multi-crop interface that provides standardized inputs via drop-down menus based on one of four crop types: alfalfa, corn, small grains, and soybeans. This application collects GPS location for each record, thereby making it better suited for less structured reporting.

All data collected is available for visualization and trends analysis. Development of interactive web-based trend mapping and display tools in currently underway.

Web maps of non-sensitive data will be prepared and made available to contributors and others to access and embed within their respective web pages.

Expected and Observed Impact

Expected impacts were the improvement of data management by automating the data collection process and eliminating text and Excel spreadsheet formatted data sent via individual emails and the need for consolidation. As a result of these applications, all data collected is downloadable Excel or text formats. The standardization and automation brought to the process greatly reduced the prior data management requirements necessary for data analysis and visualization.

An expected impact was that input from data collectors would be sought and incorporated into the application development process to improve acceptance, encourage use, and to extend applicability. Workshops providing hands-on testing and webinars with online demonstrations solicited suggestions which resulted in improved, modified, and more user-centric application.

The continued privacy of any confidential material involved in the collection of the data was a priority expectation. These applications function within a group structure with membership controlled by a group owner. The shielding of any confidential material is possible while at the same time permitting easy access to the non-confidential material.

Project Conclusion:

As outlined in the Executive Summary, the focus of this project was the development of smartphone and tablet-based applications for the collection of geospatially referenced pest and disease presence, and severity data associated with field crops. We successfully created applications that addressed the data collection needs associated with both the Western Bean Cutworm and the more general Field Crops IPM Reporting efforts. Although using different development tools, both of these applications function on iOS and Android devices as we planned. Both applications provide standardization of data input and improve the efficiency of data collection and management. Feedback from the data collector's this season will be assessed and improvements made as needed. The development of these applications has spawned interest from other agricultural sectors.