XXVII International Congress of Entomology

New Discoveries through Consilience

Abstract Book

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resistance. To address this issue, we developed a spatially-optimized sequential sampling plan using spatio-temporal thrips data collected during the 2021 and 2022 growing seasons to reduce the overall sampling time required to make control decisions, thereby increasing efficiency and grower adoption.The sampling plan was designed using Taylor's power law to determine thrip population aggregation patterns and Wald's sequential probability ratio test (SPRT) to determine the optimal decision by calculating the likelihood ratio between the null (spray) and alternative hypotheses (no spray), based on the observed data, at each step of the sampling process. The goal of the sampling plan was to reduce the number of samples needed to be taken to optimize insecticide applications required while still maintaining effective control of onion thrips populations. Our results demonstrate that the sequential sampling plan was effective in reducing the sampling effort required to estimate populations of onion thrips by up to 76% compared to the traditional fixed sampling approach. The greater level of surveillance of our plan also helped growers optimize insecticide applications without compromising control of onion thrips populations. The findings from this project have been incorporated into a digital application called ‘ Sampling by Cornell’ where stakeholders are able to track and store the information gathered through sampling.

(Thu. Aug 29, 2024 11:45 AM - 1:30 PM Poster (Event Hall))

[P0796] Hit the road of plant usages to consilience with Knomana

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Adopting the One-Health approach means reconciling all domains of health (human, public, animal, plant, and environmental) while considering consilience. Applied to crop protection, in particular the substitution of a synthetic pesticide using a botanical product, e.g. an aqueous solution or an essential oil, the first challenge is to choose a plant species, a chemotype, or a mixture of plants whose effects on pest or disease have been scientifically demonstrated in the literature. The adopted botanical can range from a local wild plant to allochthonous cultivated plants. Another challenge is to ensure that this product is less harmful to human, animal, and environmental health than the pesticide. For example, despite the well-known beneficial effects of neem against many pests, it has a spermicidal effect, requiring precautions in its use. In addition, the impact on environmental health or an ecological service as the natural regulation of the pests by their natural enemies, is rarely considered. Therefore, the aim of our work is to help researchers and technicians to tackle these challenges.
The method adopted is based on the construction of a knowledge-based system named Knomana. This system includes a knowledge base, which brings together results presented in the scientific literature on the use of plant-based products for animal, plant, human, and environmental health. The base currently contains 48,000 use results covering 2,800 plant species to control 740 species of pests, including vectors. To navigate and explore this knowledge base, analysis tools, e.g. the RCAviz editor, have been developed based on Formal Context Analysis, a data mining method derived from artificial intelligence.While computer scientists, entomologists, microbiologists, and agronomists are currently carrying out construction of this system, its development need collaboration with pharmacists, veterinarians, epidemiologists, ecologists, etc. in order to fill the knowledge base, to cross disciplines and to combine knowledge on the plant usages resulting of a better choice of a plant for the different health.