

AGR1431: Coordinated Surveillance, Forecasting, and Risk Warning System for Field Crop Insect Pests of the Prairie Ecosystem

There were no reported variances in 2018, the final year of this project. The annual insect surveys during the growing season provided a record of current insect populations, and reflected the future to varying degrees. Long-term surveys of insect populations provided a general overview of pest and natural enemy population trends over time. Provincial and industry collaborators, together with project team members, monitored 3,047 sites for grasshoppers, 733 for wheat midge, 597 for cabbage seedpod weevil, 635 for bertha armyworm, 471 sites for pea leaf weevil, and 102 for wheat stem sawfly (Figure 1). In addition, sentinel sites were monitored for flea beetles, swede midge, *Contarinia brassicola* (a newly discovered species of midge attacking canola flowers), and cereal leaf beetle. The distribution of these sites is presented on the map below. The number of sites sampled in the 2018 growing season was greater than the number of sites sampled in 2017. The potential for migratory pest species, such as diamondback moth and leafhoppers and cereal rusts, was assessed using wind trajectory data (in collaboration with Environment and Climate Change Canada). Back trajectory data from 60 sites in Canada and forward trajectory data from 20 sites in USA and Mexico were assessed on a daily basis during each growing season (12,000 maps at three wind altitudes).

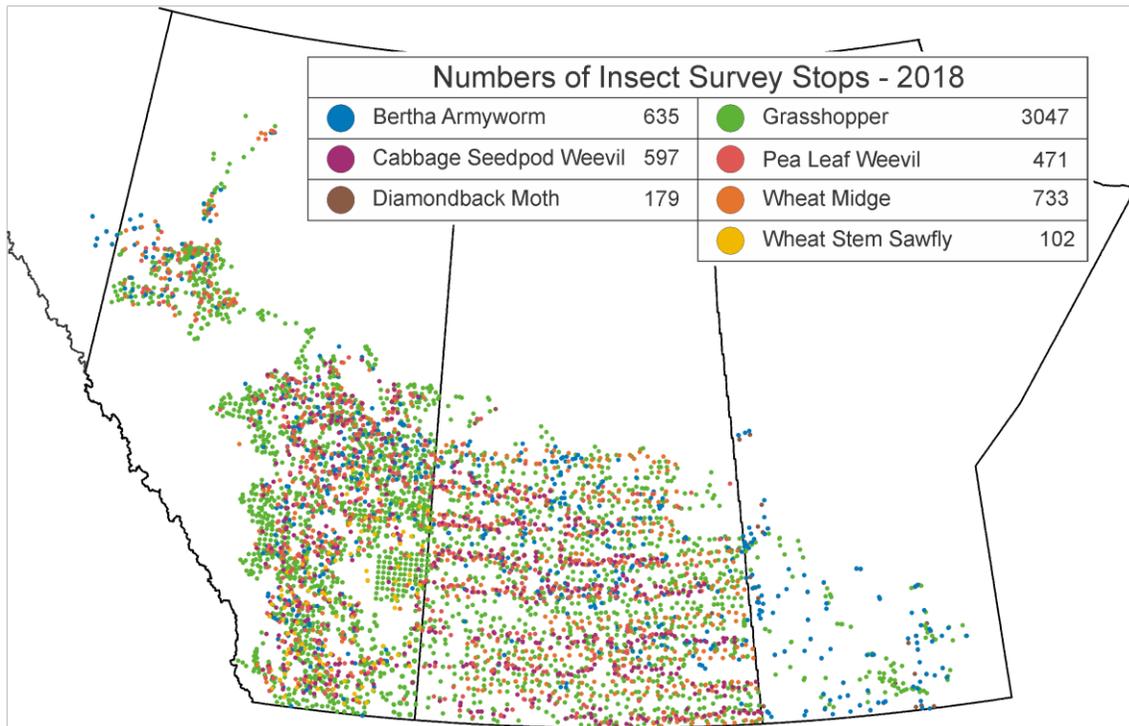


Figure 1. The total number of sites sampled for insect pests on the prairies in 2018.

Over the course of this project, insect pests of field crops in Western Canada fell into three categories: (i) native insects such as grasshoppers (all crops), wheat stem sawfly (cereals), lygus (broadleaf crops); (ii) invasive alien species such as wheat midge (wheat and triticales), cereal leaf beetle (all cereals), cabbage seedpod weevil (canola), and pea leaf weevil (pulse crops); and (iii) migratory insect pests such as diamondback moth (canola) and leaf hoppers (transmission of Aster Yellows to all crops). A pictorial insect scouting chart spanning the growing season was developed for key insect pests of canola and flax production. Timely risk warnings, provided in map format and accompanied with interpretive text, were produced for the industry. Project participants spoke at various industry and scientific meetings, conferences, and outreach events to share information generated by this project. Project resources were leveraged to provide early warning of potential new invasive species for Canada and quantify risks associated with these invasions.

In all years of the project, emphasis was placed on documenting natural enemy populations. Beneficial insects collected in fields were divided into three functional groups: (i) Parasites/parasitoids (e.g. parasitic Hymenoptera); (ii) Pollinator/Nectar Feeders (e.g. bees, lacewings, hoverflies); and (iii) Predators (e.g. ladybird beetles, damsel bugs, pirate bugs). Parasitoids were the predominant natural enemy detected in all years of the project, although the population density and impact of predators may have been underestimated due to sampling bias, as most of the sampling practices used for crop pests (i.e. sweep net sampling, pheromone traps) do not accurately sample predatory species such as ground beetles.