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AsiaBlight (a late blight network for Asia) initial project - Developing a coarse-scale map of Phytophthora infestans

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Introduction: Late blight is the greatest disease threat to potato crops worldwide and a major constraint to sustainable tomato production in many locations. Since the 1980s the pathogen has undergone global population changes with the emergence and migration of new, aggressive, sometimes fungicide-resistant genotypes. Understanding these is crucial to many aspects of effective late blight control including use of resistant cultivars, appropriate fungicides and decision support systems. In Asia, numerous researchers work on late blight, but communication and coordination is limited so there is no overall picture of the *P. infestans* population. Results may not be comparable because of lack of standardized protocols and databases. To address similar problems in Europe, researchers in that continent formed the network EuroBlight over a decade ago. More recently, networks have been set up in the USA and South America. These add value to existing research programs, using tools that provide improved data management, online communication, standardized protocols for mapping pathogen populations, quantifying host resistance and validated forecasting models. The AsiaBlight initiative aims to function as a late blight network for Asia, using these same tools to enhance collaboration. Its initial project, started in 2016, is to develop is a coarse-scale map of *P. infestans* in Asia. This will serve as a baseline for pathogen studies and underpin future endeavours of AsiaBlight to improve on-farm disease management. It will also provide a forum to increase collaboration among public and private organizations in Asia.

Material and methods: FTA cards (Whatman Classic FTA cards) were sent out by the Inner Mongolia Potato E & T Research Center, Inner Mongolia University, Hohhot, China to contacts in 10 countries across the region (10-100 cards per country depending on potato production area) with instructions for sample collection and standard forms for detailing sample information. Contacts were requested to use one FTA card per site and to sample four separate actively sporulating lesions from each site following the protocol developed by EuroBlight. Information requested included site location, host, cultivar and disease level at sampling. After sample collection, samples were returned to the Potato E & T Research Center for DNA analysis using standard microsatellite markers, allowing genotypes to be determined. Genotype data will be uploaded to the global Euroblight database, which allows for mapping of the population at different geographic scales, and provides tools for analyses of pathogen population dynamics.

Results and discussion: FTA cards were sent to contacts in Bangladesh, Georgia, India, Indonesia, Japan, Republic of Korea, Nepal, Taiwan, Tajikistan, Uzbekistan and Vietnam. Sampling and genotyping of crops in China and in the Republic of Korea are being carried out as part of other projects so AsiaBlight FTA cards were not required. Contacts able to participate have not so far been identified in Armenia, Kazakhstan, Kyrgyzstan, Myanmar and Pakistan. Sampling time depends on when potatoes and/or tomatoes are grown and late blight is active in each country. To date (December 2016), samples have been collected from Georgia, Japan, Indonesia and Taiwan. Microsatellite analysis of *P. infestans* DNA samples is in progress. Standard DNA from known genotypes will be used to allow accurate genotype identification. Once genotyping is complete, results will be uploaded to the EuroBlight database.

Conclusion: The mapping project will allow the presence of dominant clonal lineages of *P. infestans* across Asia to be determined, potentially allowing tracking of genotype spread including fungicide-resistant types. It will also indicate the likelihood of sexual recombination, which brings the risk of increased pathogen variation and contamination of soil by long-lived oospores.

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