Climate change could alter patterns of disturbances from pathogens through (1) direct effects on the development, survival, reproduction, dispersal, and distribution of pathogens; (2) physiological changes in tree defenses; (3) indirect effects from changes in the abundance of mutualists and competitors.

In general, any climate change could increase the incidence and spread of root disease if host trees become maladapted and undergo stress due to climate change. In addition, climate change could alter fitness of various mycorrhizal fungi and other beneficial microbes that currently suppress root disease.

Some reports suggested that hot and dry conditions (e.g., prolonged drought) are expected to increase incidence and spread of root diseases in forests. However, it is difficult to specifically predict how this climate change will affect diverse root diseases under various projected climate scenarios. Currently, the distribution of pathogens that cause root disease in the western USA is not well documented. Current disease surveys often overlook non-symptomatic trees that are infected by pathogens.

An example of predicting Armillaria ostoyae based on climate variables will be discussed at the workshop. A short description of this pilot project follows: To develop a climatic envelope for A. ostoyae, latitude, longitude and elevation were compiled from 102 confirmed locations where this species was found. These location data were used to develop climate-variable estimates from a spline-climate model at 1 km2 resolution followed by Random Forests multiple-regression tree analyses.

Currently available climate models that predict suitable climate space for forest tree/shrub/forb species based on various climate change scenarios will also provide a basis to determine climate effects on host vigor and pathogen distribution in the western USA. These approaches will be discussed at the workshop.