



Climate change and plant disease

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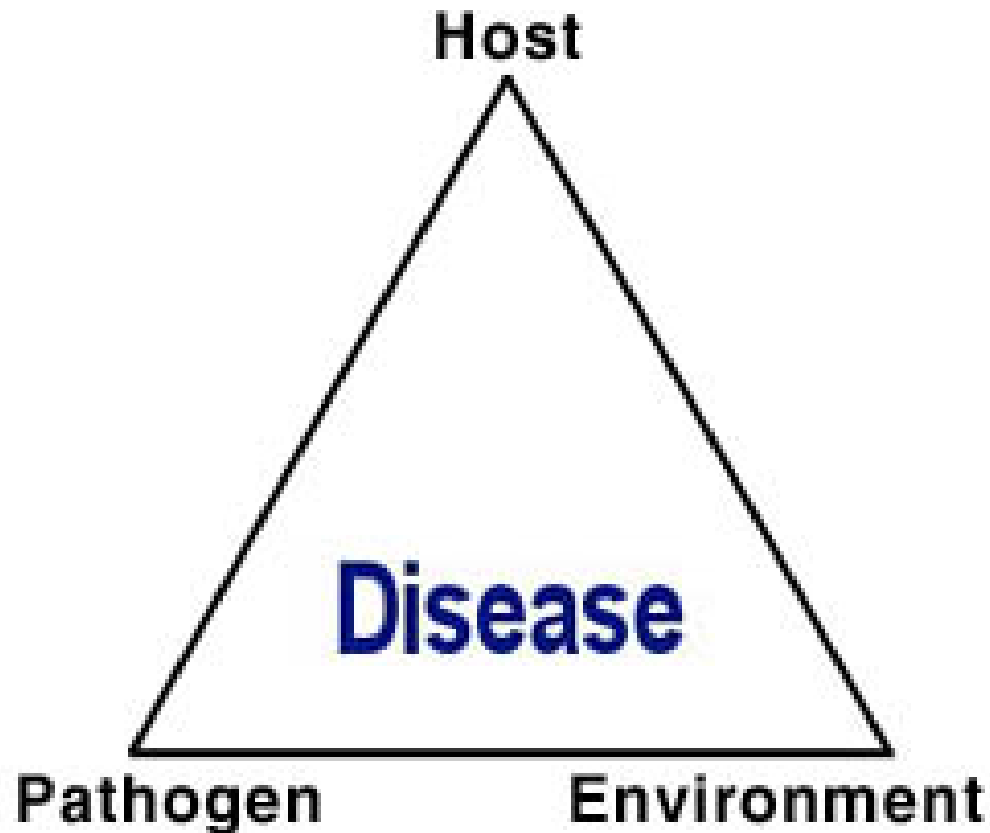
Climate Change and Agriculture in New Jersey

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Understanding plant disease development

- All diseases that occur in plants driven by three main factors:
 - Host
 - Pathogen
 - Environment
- In order to understand disease development in plants you need to understand all three and the relationship(s) between them
- From a plant pathologist, this is simply known as the disease triangle...
- Most basic concept in understanding disease development

The Disease Triangle



Climate change and plant disease development

- As(if) global temperatures continue to warm and weather (temperatures/rainfall/humidity) increases over time we can expect to see more tropical/subtropical plant pathogens and insect pests to become more prevalent in the state of New Jersey.
- Nighttime minimum temperatures are expected to increase more than day time maximum temperatures, and winter temperatures are expected to increase more than summer temperatures
 - Harvell et al. 2002. Climate warming and disease risks for terrestrial and marine biota. Science 296:2158-2162.

Climate change and vegetable disease in NJ

- Right now, the Delaware bay acts as a buffer that prevents some of the diseases (and insect) issues they have in the Southeast (even as close as the Eastern Shore) from becoming major issues in NJ vegetable production.
 - This includes soil-borne and airborne (insect-vectored) pathogens
 - *Sclerotinia rolfii* (Southern blight)
 - *Ralstonia* (Bacterial wilt in tomato)
 - Whitefly and thrips-vectored viruses
- Currently, our long “cold” winters benefit this region greatly!
- Many obligate pathogens don’t survive, or survive poorly, because our winter...

Right now the what-if questions are, for example...

- What if New Jersey summers become more like Florida's?
 - They can't grow vegetables in the summer in FL because it is too hot!
 - Would the change in winter weather conditions in NJ allow us to have two growing seasons, spring and fall, like in Florida?
 - How would the lack of a "true" winter season affect major pests?
 - Would NJ vegetable growers have to adopt the use of different production methods (i.e., covered production)? Different crops?
 - If our growing season becomes more like the southeast and south would we be able to compete for the same market share?
 - Right now there is still some seasonality left in the market, what if that disappears?
 - Free trade already hurts the FL tomato market...
 - Could NJ vegetable growers afford the water, would they have access to more?