

Targeted Discovery Sampling for *Phytophthora ramorum* in Nursery Stock

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Targeted sampling is used to detect defective or hazardous items in populations, but is routinely criticized as a non-probability sampling method with drawbacks including the inability to make statistically valid inferences about the sampled population. Recent advances in stratified discovery sampling theory have remedied this defect; we apply this new technique to evaluate sampling and testing protocols to detect *Phytophthora ramorum*-infected nursery stock. Stratified discovery sampling relies on identifying sub-populations (with easily identifiable characteristics) which are enriched with the defective items. Incorporating test sensitivity and the relative frequencies of the indicator characteristic in defective and non-defective subpopulations we can infer the true prevalence in the entire population. The target category is symptomatic plants. Assuming a screening (ELISA) test sensitivity of 0.95 and conditional probabilities of plants showing symptoms of 0.5 for infected and 0.05 for uninfected plants, the resulting target population has a disease prevalence 10 times higher than the entire population. Thus a sample size of 40 in a targeted population is equivalent to a sample size of 400 in the general population.