Invasive potential of *Prunus* species in Minnesota landscapes
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In Europe, *P. serotina*, introduced for timber production, has invaded parts of the landscape; however, the mechanism by which this has occurred is not understood (Pairon et al. 2006; Phartyal et al. 2009). In order to prevent further episodes of invasiveness, this project’s goal is to study how species in this genus propagate and establish in the landscape. This will be accomplished through the study of the pathway to invasiveness by analyzing seed germination, seedling establishment and pollen viability in *Prunus* cultivars, hardy in USDA Zone 4. It is important to keep in mind that although the focus of this work is invasiveness, the knowledge gained can be applied in areas like breeding.

Establishment of genetically diverse populations requires effective germination. For germination in *Prunus* to occur, deep physiological dormancy and mechanical dormancy must be overcome (Baskin and Baskin, 1998). This can be achieved through long periods of cold stratification and potentially scarification (Chen et al. 2007; Hartman et al. 1997; Kristiansen and Jenson, 2009). In 2012, a preliminary study was carried out to examine patterns of germination and the need for scarification in selected cultivars (22 plum, 5 tart cherry and 3 apricot). The seeds in this study were collected from open pollinated trees. This study was carried out in two environments, greenhouse and field, and with two sub-treatments, mechanically scarified and not. All seeds were warm stratified for two weeks prior to cold stratification, 120 days in the cooler (greenhouse) or overwintered in field. Germination success was dependent upon cultivar and environment with the highest percentages observed in greenhouse. Although germination success was environment dependent, apricots showed the highest rates (30 to 100%), tart cherries the lowest (0 to 35%) with the plums being variable. Scarification was often unnecessary but the need was cultivar dependent. Currently, a similar study is being carried out to see if patterns observed are repeatable as well as if seeds, that fail to germinate, are viable. The general protocol of this study is the same. Seed viability will be determined by TTC (tetrazolium chloride) staining of seeds that fail to germinate. Since seed was from open pollinated trees, nonviable seed could have been the result of wide crosses.

Seedling establishment is an important aspect of invasive potential. Even if seeds germinate, they will not necessarily survive. To test survival, germinated seeds from the germination study can be kept in the field and observed for establishment. Additionally, cultivars with high germination rates can be harvested, germinated and planted in the field to observe establishment and survival.

Pollen viability describes the potential to germinate, form a pollen tube, fertilize the ovule and initiate seed set (Dafni and Firmage, 1999). To measure viability, staining with aniline blue will be used because they are less time consuming than other methods and provide a good estimate of male fertility (Bolat and Pirlack, 1999). Aniline blue in propionic acid stains dark blue if cytoplasm is present, thus, differentiating between aborted and non-aborted pollen grains (Anderson and Ascher, 1993). This study will estimate male fertility, which is not only important for understanding sexual reproduction in regards to invasiveness but also for applications in breeding.
Literature cited


