

Effect of seed maturity on sensitivity of seeds towards physical sanitation treatments

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(Accepted September 2005)

Summary

Physical sanitation methods are used by the seed industry to prevent transmission of seed-borne diseases, but sensitivity varies between seed lots. The effect of seed maturity on the sensitivity to hot water, aerated steam and electron treatments was studied. Two *Brassica oleracea* L. and two *Daucus carota* L. seed lots from commercial production were selected for containing relatively large amounts of less mature seeds. Each seed lot was sorted into three maturity fractions based on the levels of chlorophyll fluorescence of individual seeds. Less mature *B. oleracea* and *D. carota* seeds were more susceptible to hot water treatments and less mature *B. oleracea* seeds to the aerated steam treatment. Seed maturity did not influence the sensitivity to the applied electron seed treatments. Seed lots were not selected for infections with seed-borne pathogens, however the less mature seeds were observed to be more frequently infected. It would be advisable to harvest seeds as mature as possible and to remove less mature seeds during seed processing. Sorting seeds by their level of chlorophyll fluorescence provides a useful method of sorting *B. oleracea* and *D. carota* seed lots. This would result in more efficient physical sanitation of seed lots.

Introduction

The use of vigorous and healthy seeds is an essential start for commercial crop production. The seeds are therefore tested for their germination capacity and the absence of pathogens. Infection of the seeds is primarily prevented through measures during seed production, including the use of crop protectants. When, despite these measures, the produced seeds are infected, or the level of infection is above a certain threshold, seed lots need to be discarded or treated. In modern agriculture, the most common used sanitation treatment is application of synthetic fungicides. However, this is not possible with seeds that are used for organic farming. Moreover, seeds cannot be treated for viral and bacterial seed infections with synthetic chemicals. As an alternative, physical seed treatments may be used. Hot water treatments have been known for a long time and recipes are published for a number of crops. Several other methods have been developed, including electron seed treatment and application of aerated steam.