INTRODUCTION

The basic goal of this project is to evaluate a broad range of wild Helianthus species for Sclerotinia stalk rot resistance (Fig. 1). Wild sunflower germplasm is largely unexplored in terms of stalk rot resistance. However, seed dormancy makes the wild species more difficult to work with in field trials than cultivated sunflowers.

Screening efforts will focus on annual diploid Helianthus species in the USDA sunflower germplasm collection, primarily the non-Helianthus annuus taxa, such as H. anomalus, H. argophyllus, H. bolanderi, H. debilis (subspecies debilis, cucumerifolius, silvestris, tardiflorus and vestitus), H. deserticola, H. neglectus, H. niveus (subspecies canescens and tephrodes), H. petiolaris (subspecies fallax and petiolaris), H. porteri, and H. praecox (subspecies hirtus, praecox and runyonii).

OBJECTIVES

1. Develop a reliable greenhouse screening method using Sclerotinia-infested millet seed as inoculum.
2. Evaluate a wide array of wild sunflower germplasm for resistance. Re-test the best performing material in N. Dakota field trials.
3. Increase the number of wild sunflower accessions available in the USDA collection, so that more of the relatively uncommon species are available for evaluation.

MATERIALS AND METHODS

- Plants grown to 4-6 leaf stage.
- Inoculate soil beneath transplant with layer of Sclerotinia-infested millet.
- Record time to first wilt and plant death.
- After 20-24 days; record live plants.

Variables Being Tested

- Planting container size and shape (Figs. 2, 3, 4, 5).
- Inoculum quantity and placement.
- Plant age at time of inoculation.
- Incubation temperature.

RESULTS and DISCUSSION

Only preliminary results are available at this time. However, incubation temperature was clearly a critical factor. In growth chamber studies at 21C, 100% of the plants from a susceptible variety wilted and died within an average of 11 days (Fig. 6). At 25C, 40% of the plants of the same variety never wilted, even after 20 days (Table 1).

This is consistent with previous studies which concluded that the optimal range for growth and pathogenesis is 20 to 25C (Tannikut and Vaughan, 1951; Van den Berg and Lentz, 1968; and Newton et al., 1973). This indicates that greenhouse screening should be avoided during the summer months.

LITERATURE CITED


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