Overwintering of the Dollar Spot Pathogen Occurs in Shoots and May be Influenced by Temperature

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Introduction

- Dollar spot, caused by *Sclerotinia homoeocarpa* (F.T. Bennett; Sh) is one of the primary diseases of intensively managed turfgrasses worldwide
- Management of this disease has been complicated by development of fungicide resistance, loss/limitation of effective chemistries, and increasing management requirements
- It is generally assumed that Sh overwinters in dormant host tissue; however, we are only aware of a single study on this topic[1]
- This study was carried out over the course of a single winter and involved manipulation of the environment
- In the present study, we seek to more fully elucidate the contributions of *in planta* pathogen overwintering by:
  1) Determining the location of *in planta* pathogen overwintering
  2) Quantifying the overwinter survival rate of Sh and
  3) Investigating the possible effect of winter temperatures on Sh survival

Figure 1. Typical dollar spot infection center on closely mown turfgrass

Figure 2. Severe dollar spot epidemic

Materials & methods

Winter
2010
2011
2012

Spring
2011
2012
2013

A soil probe is used to collect plugs of turf and underlying roots from the margin of and ~6 cm away from dormant dollar spot infection centers on creeping bentgrass maintained at 3.5 mm

After 15 s massaging in a 0.6% sodium hypochlorite solution, roots and shoots are excised with sterile forceps and plated on semi-selective medium

Fungal colonies resembling *S. homoeocarpa* are sub-cultured and identity is confirmed through colony morphology and sequencing of the ITS region

Results

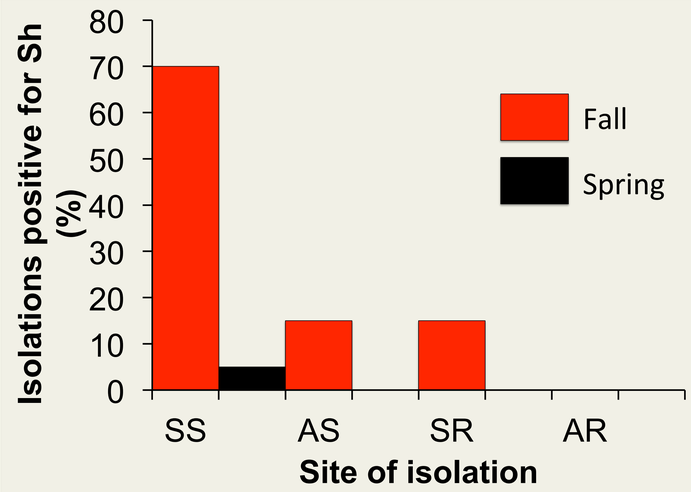

Figure 3. *S. homoeocarpa* overwinter survival in the 2010-2011 season. SS-Symptomatic shoots, AS-Asymptomatic shoots, SR-Symptomatic roots, AR-Asymptomatic roots

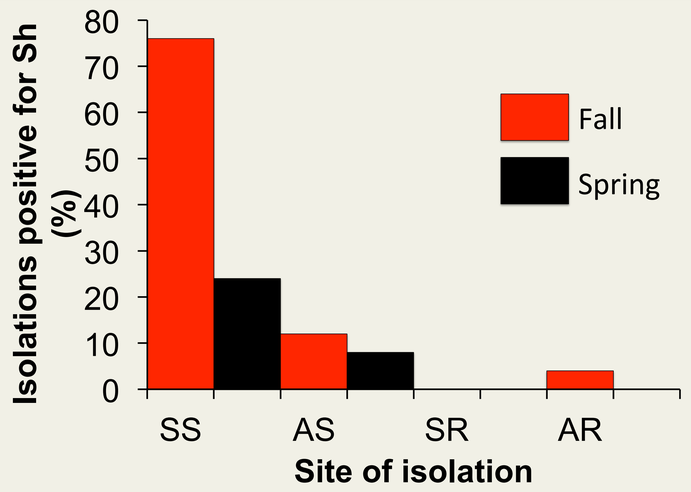

Figure 4. *S. homoeocarpa* overwinter survival in the 2011-2012 season. SS-Symptomatic shoots, AS-Asymptomatic shoots, SR-Symptomatic roots, AR-Asymptomatic roots

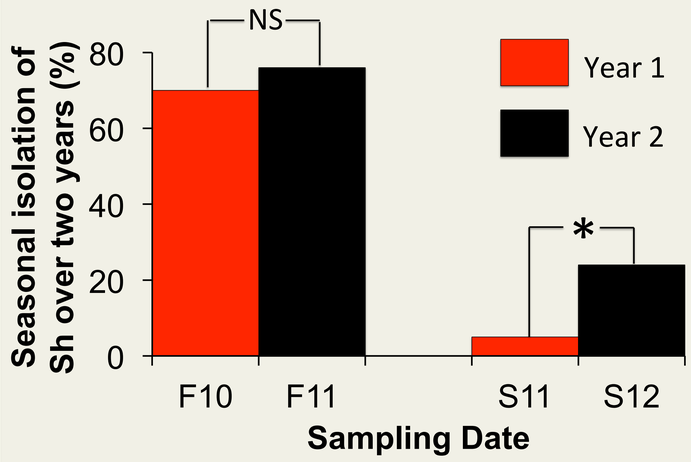

Figure 5. Annual differences in pathogen isolation from symptomatic shoots.. Two-sided independent t-test; α=0.05

Table 1. Average monthly and winter temperatures for the 2010-2011 and 2011-2012 winter seasons.

Season/Month	Average Temp. (°C)
Winter 2010-2011	-5.17
Dec 2010	-7.53
Jan 2011	-8.57
Feb 2011	-5.38
Mar 2011	0.8
Winter 2011-2012	-0.54
Dec 2011	-0.85
Jan 2012	-4.22
Feb 2012	-1.59
Mar 2012	4.51

Conclusions

- Survival as dormant mycelia in shoots appears to be a mechanism of overwintering for *S. homoeocarpa*
- Significant differences in pathogen isolation from symptomatic shoots were noted between the two years of this study
- The average winter temperature in 2011-2012 was >4.5°C higher than in 2010-2011
  - This may partially explain the different rates of *S. homoeocarpa* isolation between the two years
- The third year of this study and future investigations will allow for more thorough analysis of the link between winter weather conditions and *S. homoeocarpa* survival

References and Acknowledgements

[1]Fenstermacher, J.M. 1979. Certain features of dollar spot disease and its causal organism, *Sclerotinia homoeocarpa*. In: Advances in Turfgrass Pathology

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