

Landscape Ontario  
Tar Spot Research Project  
2006

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In the last 10 years, tar spot seems to have been increasing in frequency across southern Ontario. There has been relatively little research done on tar spot in North America. The only scientific reports have come from Connecticut (Waterman, 1941) and New York (Hudler et al. 1987 & 1998). The most recent research report which is one from New York (Hudler et al. 1998) found that the fungus *Rhystisma acerinum* is the cause of tar spot on Norway maple (*Acer platanoides*), both of which (host and pathogen) are immigrant species, while a native fungal species, *R. americanum*, occurs on red and silver maples (*A. rubrum* and *A. saccharinum*). This is probably the reason that a Norway maple may be heavily infected with tar spot while an adjacent red maple may have no spots. The infection of maples with tar spot has serious implications to nursery producers in that infected trees are hard to sell and if the frequency of tar spot continues to increase, sales of maples will likely decline. The challenge is to understand the infection mechanisms so that effective control measures can be taken at the nursery and in the landscape.

PROJECT Objectives:

To address the following questions:

- 1) What is the identity of the tar spot fungus in Ontario?
- 2) What is the spore dispersal and infection period of the tar spot fungus in Ontario?
- 3) Which fungicides are effective against the tar spot fungus?

1) Identity of the Tar Spot fungus in Ontario.

Attempts will be made to isolate the tar spot fungus from at least 50 fallen leaves starting in March 2006 using Maple leaves of varied species and geographical origin in southern Ontario. The literature states that the fungus generally needs to be isolated in the spring at time of spore dispersal and infection and is not easily obtained from dark tar spots. After isolation, the fungus will be compared morphologically and by DNA sequencing to known isolates or DNA database sequences. This will be repeated in Spring 2007.

2) Spore dispersal period.

Maples leaves infected with tar spot will be gathered weekly from the beginning of May until the middle of July 2006 (or until we are no longer able to detect spore ejection). Up to five different locations in southern Ontario will be sampled to represent climatic variation. We will attempt to correlate spore production with common phenological indicators such as flowering times and leaf sizes. This will be done again in 2007.

3) Development of an inoculation assay.

An inoculation protocol needs to be developed in order to study aspects such as infection biology and fungicide efficacy. Isolates of the fungus will be tested in amended agar petri plate tests to see which substances are active against the tar spot organism (starting spring 2006 if study #1 is successful). In spring & summer 2007, after determining the spore dispersal period (study #2), trials will be done in the field using live potted Norway maples surrounded by maple leaves bearing tar spots. Fungicide applications will be made at 1 or 2 week intervals, following rates suggested for nursery applications. Fungicides containing the following active ingredients will be tested for efficacy against tar spot: propiconazole, chlorothalonil, mancozeb, azoxystrobin, and myclobutanil.

#### Summary of Procedures

##### Data collection (by study)

- 1) DNA will be obtained from fungal isolates and sequenced
- 2) Weekly monitoring of spore production from maple leaves will be conducted
- 3) A replicated trial on fungicide efficacy will be conducted

##### c) Analysis of data (laboratory contracted, who is conducting data analysis)

The data will be collected analyzed by the principal investigator (T. Hsiang) and his associates.

##### d) Location of work

All research will be conducted at the University of Guelph, with sample collection from Southern Ontario.