

Early season infection of onions and barley by *Stemphylium vesicarium*

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Introduction

Stemphylium leaf blight (SLB) caused by *Stemphylium vesicarium* (Wallr.) E.G. Simmons is a common foliar disease of onion in the Holland Marsh, Ontario, Canada. It causes lesions and premature leaf dieback (Fig. 1 A, B) that reduce yield and prevent the uptake of sprout inhibitors, which results in losses in storage. Conidia are captured by spore traps as early as April, but symptoms of SLB do not appear until the 3-4 true leaf stage. Barley is a wind abatement crop used in seeded onions in Ontario that can be colonized by *S. vesicarium* during or after senescence.



Figure 1. Common symptoms of SLB: (A) lesions and (B) leaf tip dieback.

Objectives

- Determine if early season infection of onion occurs in Ontario.
- Evaluate the use of infection of barley and conidial counts from spore traps as indicators of early season infection of onion.

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Materials and Methods

- Ten leaves per rep of seeded onion, transplanted onion and barley from a field trial with four reps were collected twice weekly from the cotyledon to the 3-4 true leaf stage.
- Leaves were placed in humid chambers to induce sporulation and assessed for the presence of infection (Fig. 2 A, B).

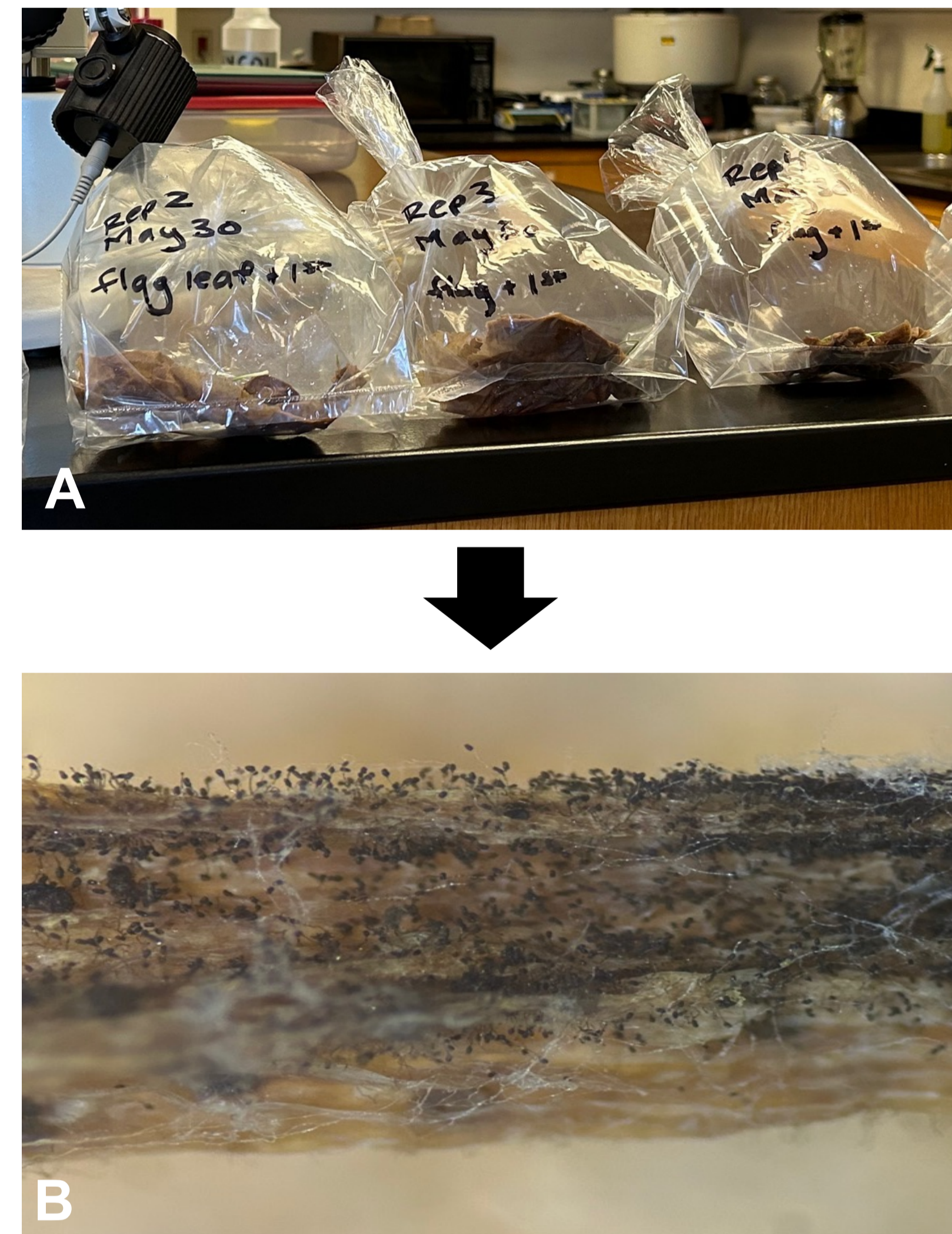


Figure 2. (A) Humid chambers containing leaves collected in the field and (B) sporulation of *S. vesicarium* on onion leaves.

- Rotorod and Burkard spore traps were placed in a field at the Ontario Crops Research Centre - Bradford near patches of weedy hosts of *S. vesicarium* beginning in April and were moved to an onion plot after emergence of the crop. (Fig. 3 A, B). The Burkard trap collected spores each day and the Rotorod 3x per week to quantify airborne conidia of *S. vesicarium*.
- Correlations between the conidia counts from the spore traps and infection of onion and barley were calculated using Kendall's Tau-b.



Figure 3. Spore traps in an onion plot: (A) Rotorod and (B) Burkard.

Results

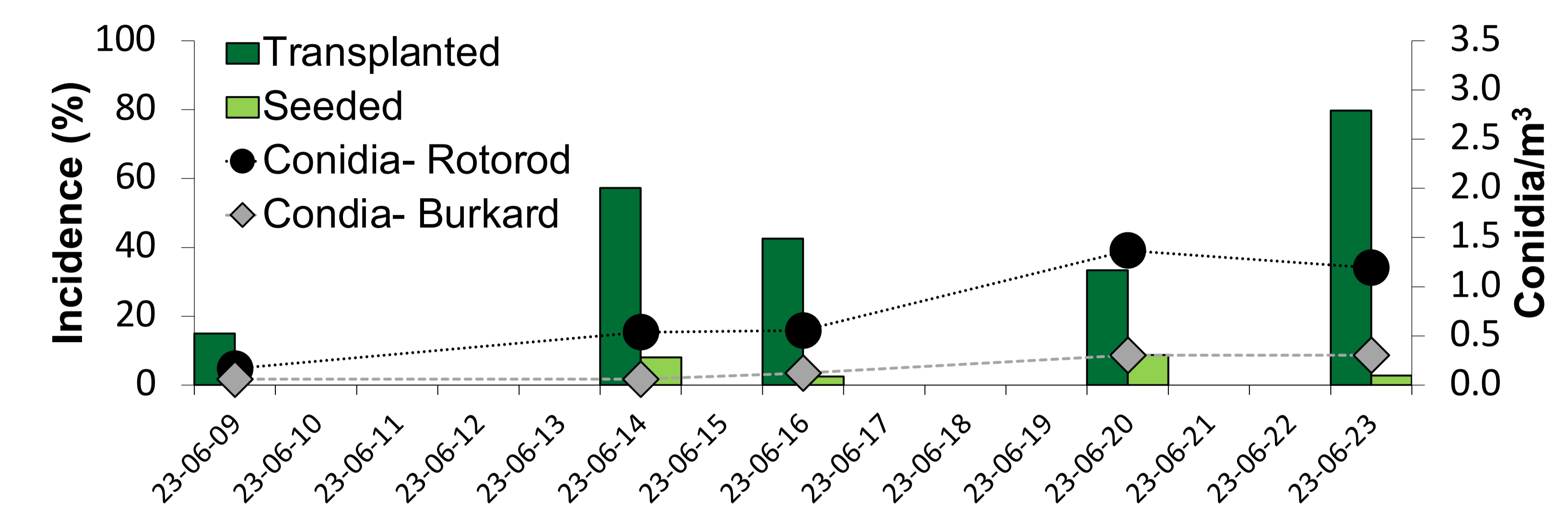


Figure 4. Infection of transplanted and seeded onions from 09 June to 23 June 2023 and 7-day mean of conidia counts from Rotorod and Burkard spore traps on each date.

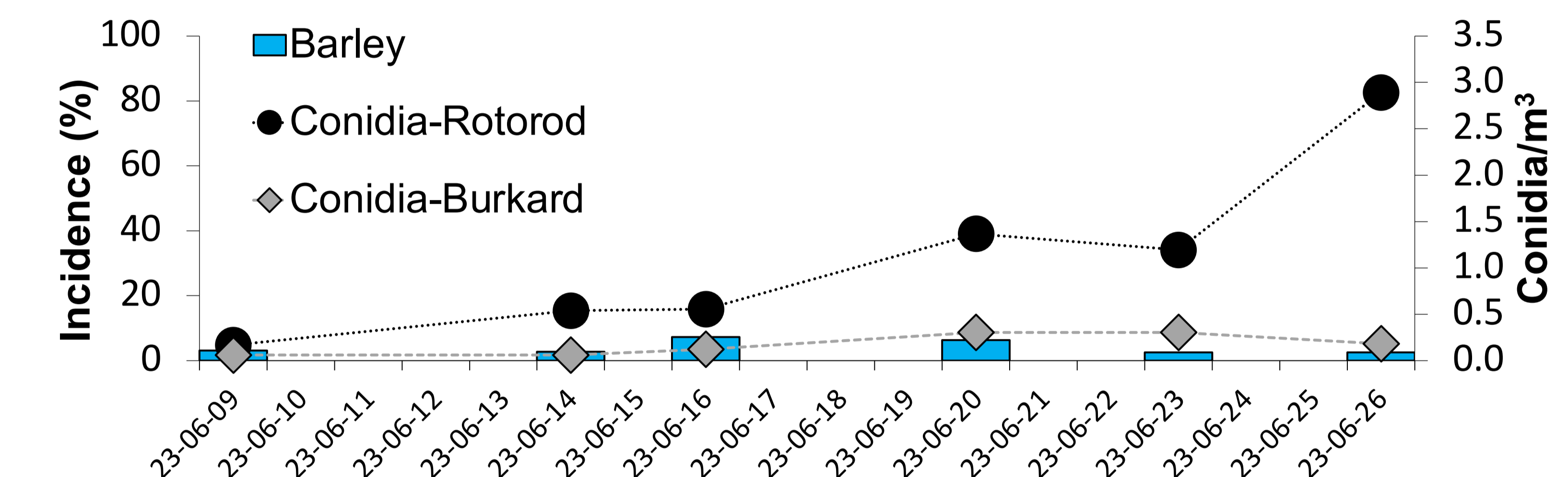


Figure 5. Infection of barley from 09 June to 26 June 2023 and 7-day mean of conidia counts from Rotorod and Burkard spore traps on each date.

Conidia-Rotorod	1.00				
Conidia-Burkard	-0.02	1.00			
Transplanted Onions	0.32	-0.77	1.00		
Seeded Onions	0.79*	0.14	0.20	1.00	
Barley	-0.05	0.77*	-0.40	0.27	1.00
	Conidia-Rotorod	Conidia-Burkard	Transplanted Onions	Seeded Onions	Barley

Figure 6. Correlation matrix for infection of onions and barley and conidia counts from the two spore traps. *Indicates a significant correlation at $P < 0.05$.

Conclusions

- Infection of onion by *S. vesicarium* was present by the 2nd true leaf stage (Fig. 4).
- Infection of barley occurred at the same time as infection of transplanted onion. However, infection of onion and barley were not correlated in 2023 (Fig. 5).
- The Rotorod spore trap was more strongly correlated with infection of onion than the Burkard spore trap. The Rotorod may be better for monitoring *S. vesicarium* conidia early in the growing season (Fig. 4, 5, 6).