

Detection of fungicide resistance in populations of *Venturia pirina* in California pear orchards

Identification and control of pear canker diseases in California



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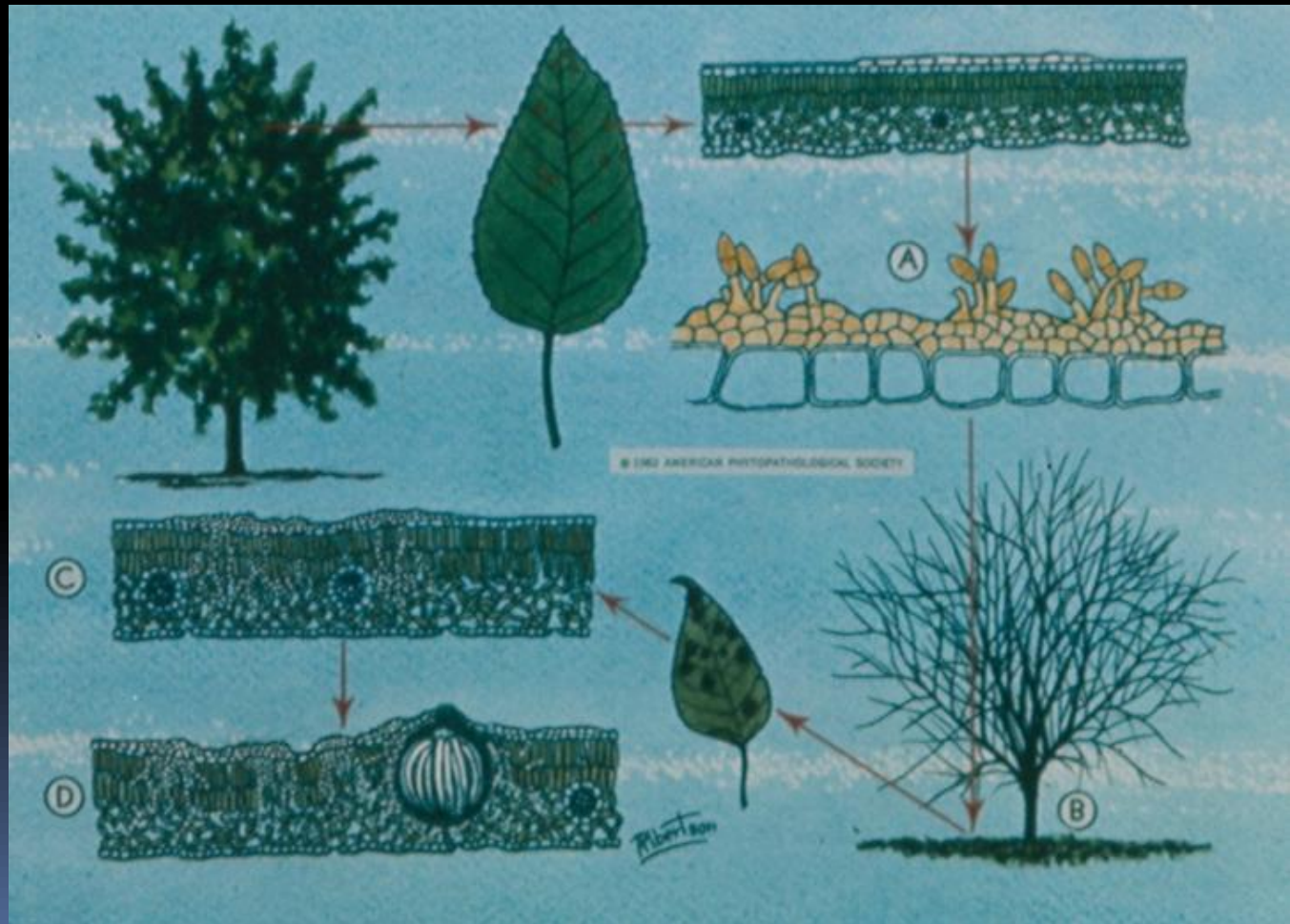
Rachel Elkins, UCCE

Chuck Ingles, UCCE

Pear Scab: *Venturia pirina*



Venturia pirina Disease Cycle




OBJECTIVE 1: Fungicide Resistance:
Determine fungicide resistance in *Venturia
pirina* populations.

Procedure

- Isolates of *Venturia pirina* were collected in 2012.
- The isolates were sub-cultured on PDA-tet and fungicide EC50's determined using Autoplate 400.
- A solution of 50ppm of fungicide was spiral plated onto 150mm agar plate.
- The plate was radially streaked with a conidial suspension of isolates.
- After one week, EC 50 values are measured.



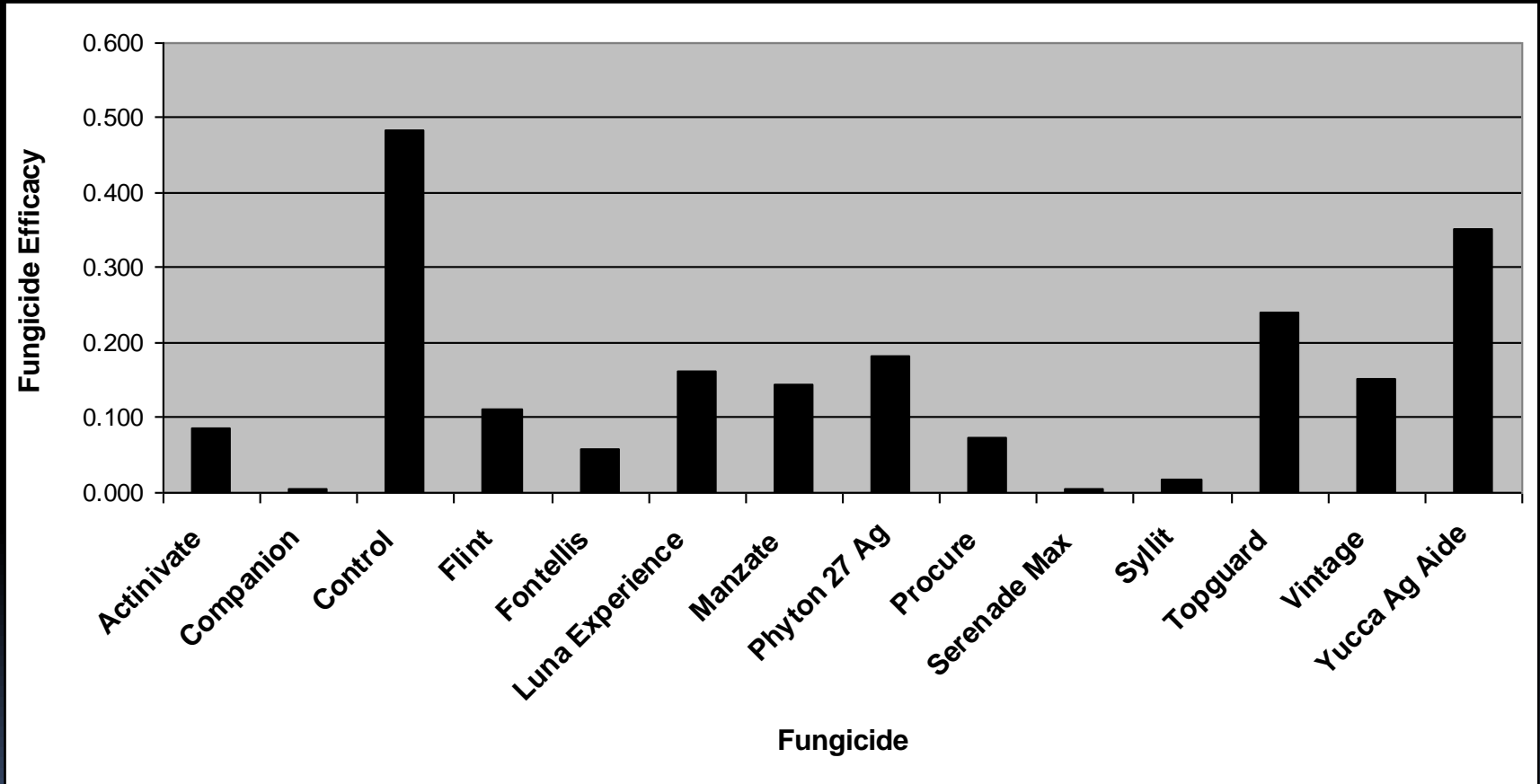
EC 50 Values

- EC 50 is determined by the point on the plate where the fungal growth is inhibited 50% by the fungicide.
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Fungicides Tested

- Actinovate (*Streptomyces lydicus*)
- Companion (*Bacillus subtilis*)
- Flint (trifloxystrobin)
- Fontellis (penthioopyrad)
- Luna Experience (fluopyram)
- Manzate (zinc, manganese and ethylenebisdithiocarbamate)
- Phytan 27 Ag (copper sulphate pentahydrate)
- Procure (triflumizole)
- Serenade Max (*Bacillus subtilis*)
- Syllit (dodine)
- Vintage (fenarimol)
- Topguard (flutriafol)
- Yucca Ag Aide (steroid saponins)

Results

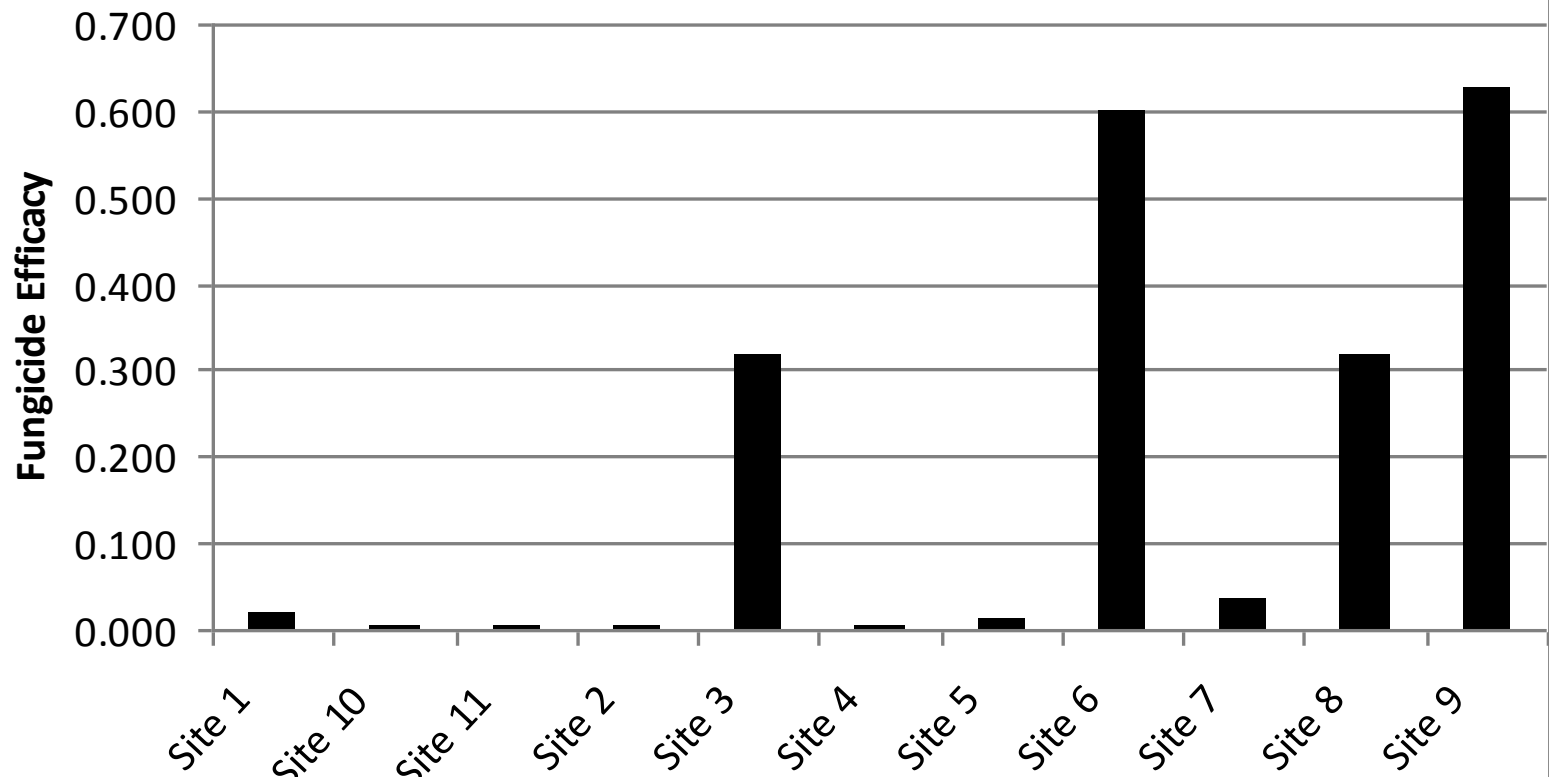


Resistance Results

- Pear scab resistance was seen to Flint, and fungicide inactivity or possible resistance was shown to Manzate, Luna Experience, Phyton 27 Ag and Topguard.
- The most effective fungicides against *Venturia pirina* were Syllit, Fontellis, Companion and Serenade Max.

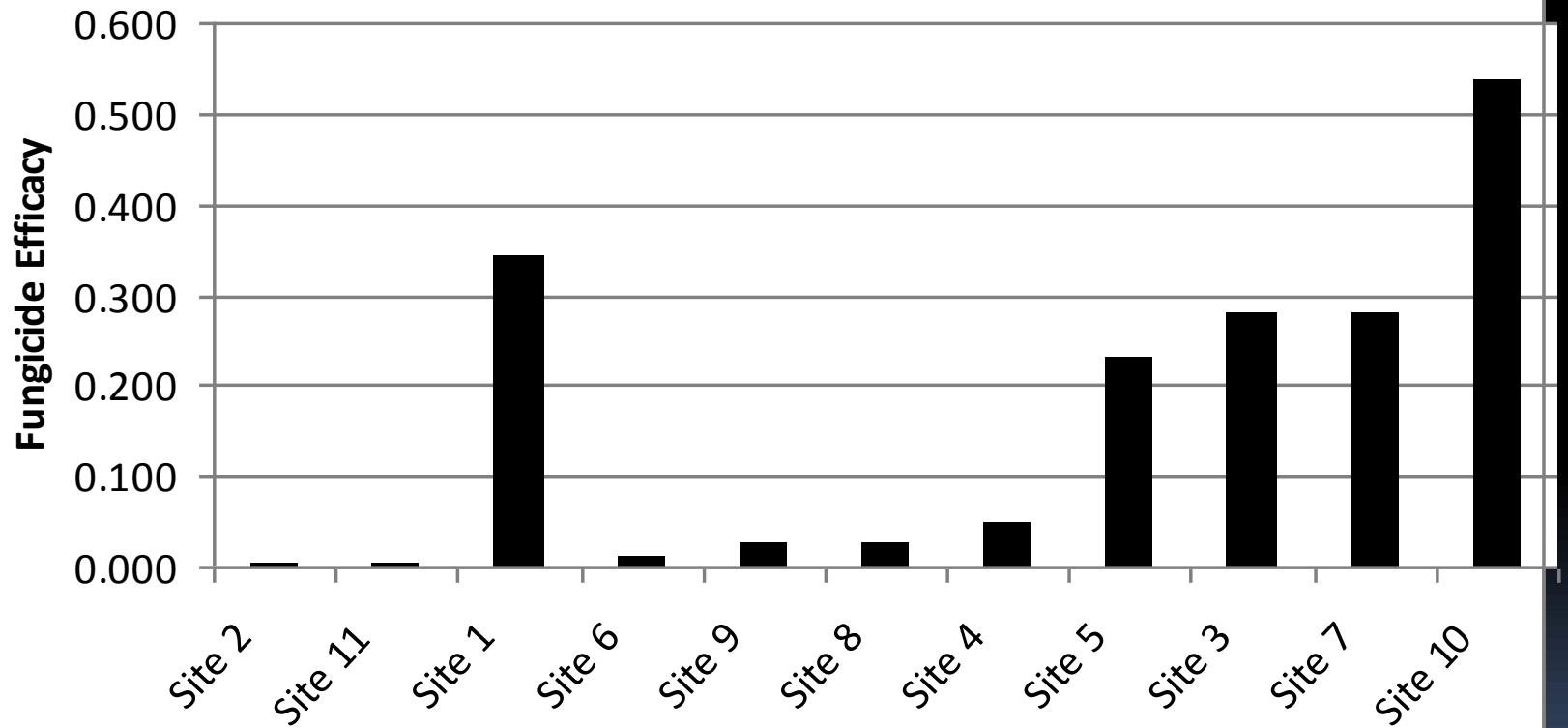


Flint



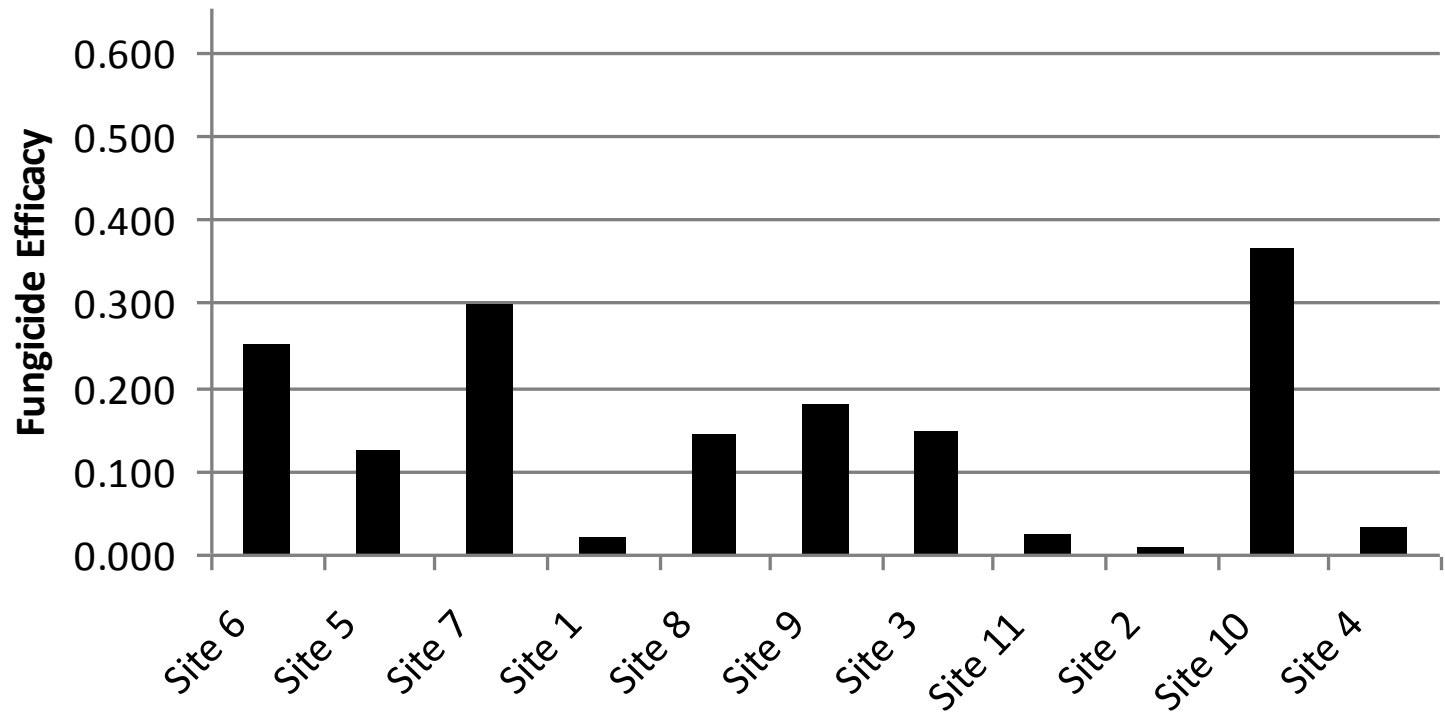
2012 Autoplate 400 Spiral Gradient Experiment Results

Luna Experience

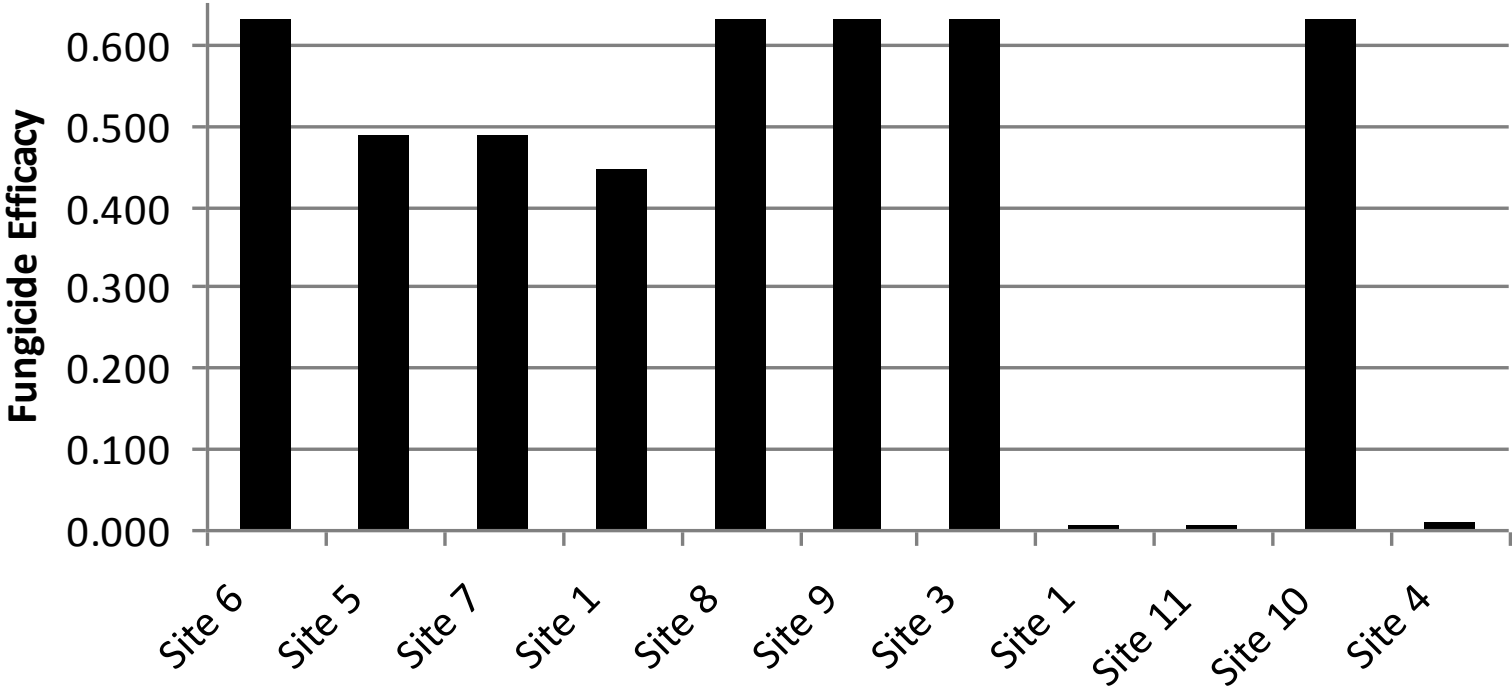


2012 Autoplate 400 Spiral Gradient Experiment Results

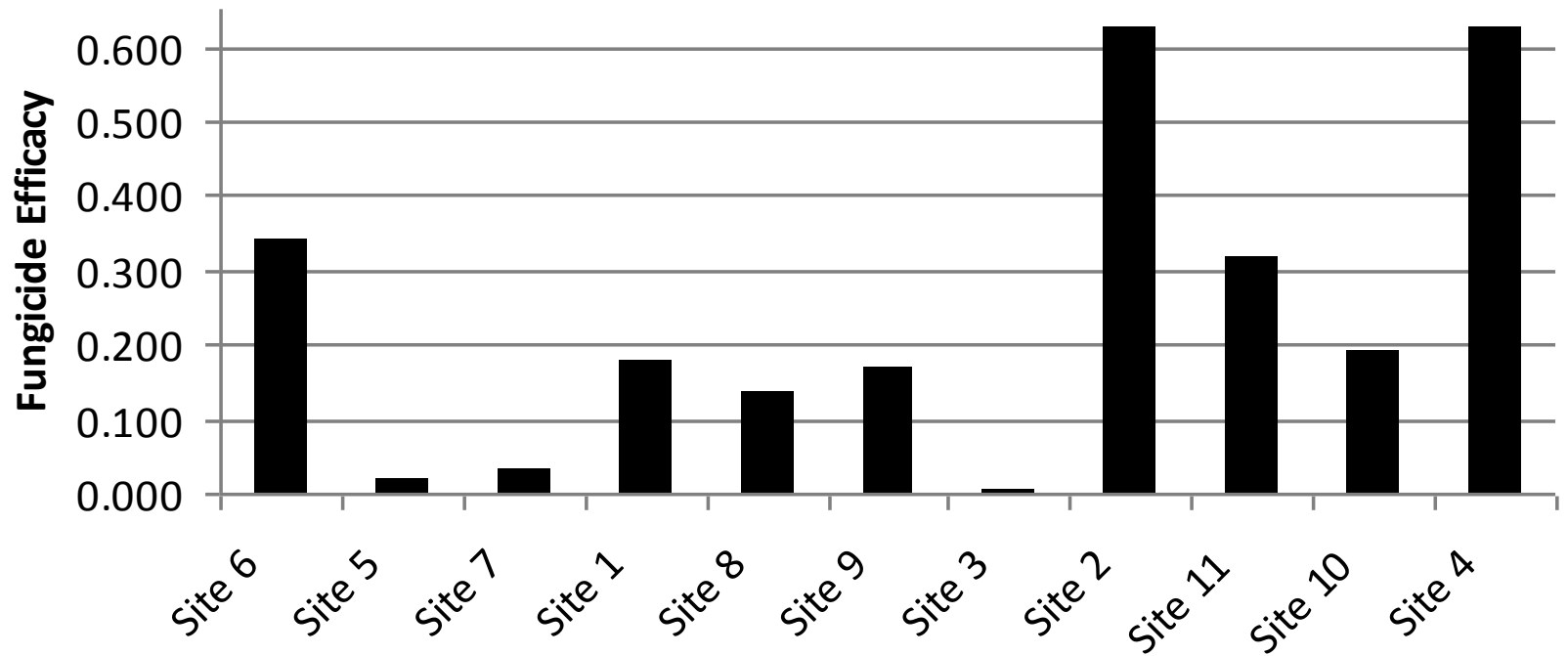
Manzate




Phyton 27 Ag



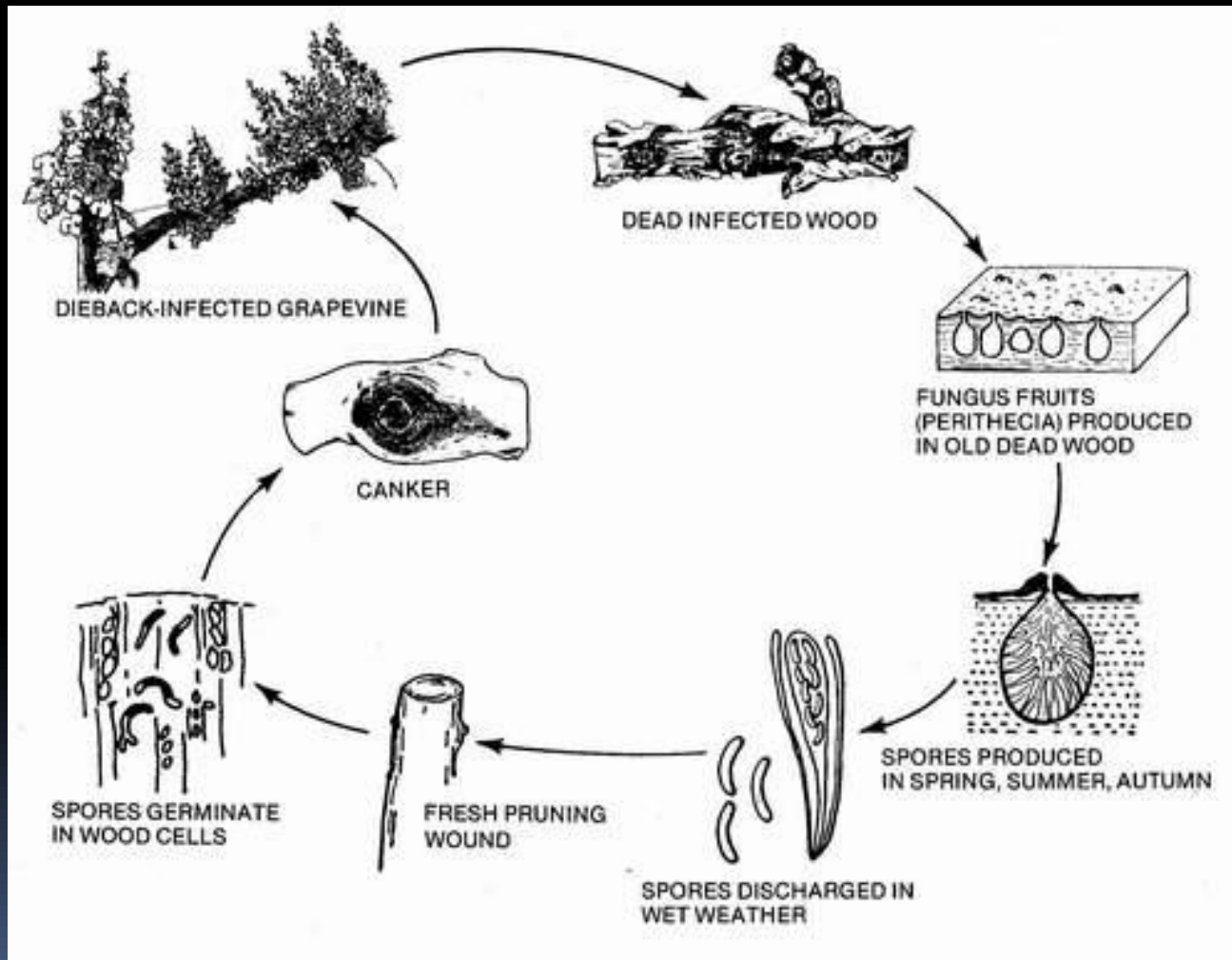
Topguard






OBJECTIVE 1. Pear Canker:
Determine the geographical
distribution and incidence of
Botryosphaeria spp. and *Eutypa lata*
in pear cankers in Northern
California.

Pear Canker Lifecycle





Procedure

- Pear orchards in Mendocino and Lake counties were visited and fungi were isolated from branches showing dieback and disease symptoms.
 - Spore trapping studies were conducted in different orchards in Mendocino County with severe canker disease problems.
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Results

Several pathogenic fungi were recovered from cankers in stems and branches of Bartlett pears.

Botryosphaeria obtusa, *B. dothidea*, *B. iberica*, *Eutypa lata*, *Potebniomyces pyri*, *Cytospora austromontana*, *Phaeoacromonium* spp., *Sphaeropsis sapina*, *Diplodia seriata*, *Cryptosporiopsis* sp., *Bionectria* sp., and *Leucostoma personii*.

Spore Trapping in Pear Orchards

Spore traps have shown the presence of the following pathogens and 2° basidiomycetes:

Sphaeropsis sapinea

Phaeoacremonium rubrigenum

Botryosphaeria obtusa

Cryptovalsa ampelina

Eutypa lata *Trametes versicolor*


Stereum species

Ganoderma lobatum.

OBJECTIVE 2. Identification and characterization of *Botryosphaeria* spp. associated with pear dieback in California.



Results

- *Botryosphaeria obtusa*
 - *Botryosphaeria dothidea*
 - *Botryosphaeria iberica*
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OBJECTIVE 3. Determine the pathogenicity and symptoms of *Botryosphaeria* and *Eutypa lata* associated with pear canker disease.

Results

Species	Isolate #	Trial 1		Trial 2	
		Re-isolated	Avg Lesion Length*	Re-isolated	Avg Lesion Length*
Bionectria sp.	UCDX106	YES	0.2	YES	0.2
Botryosphaeria dothidea	UCDX101	YES	2.1	YES	0.9
Botryosphaeria iberica	UCDX104	YES	0.2	YES	0.8
Botryosphaeria obtusa	UCDX102	YES	1.3	YES	0.2
Botryosphaeria obtusa	UCDX103	YES	1.7	YES	0.4
Botryosphaeria obtusa	UCDX105	YES	2.3	YES	0.5
Cryptosporiopsis sp.	UCDX107	YES	1	YES	0.5
Leucostoma personii	UCDX109	YES	1.5	YES	0.8
Phaeoacremonium angustis	UCDX121	NO	---	nt	---
Potebniomyces pyri	UCDX122	NO	---	nt	---
* Measured in cm					
nt = not tested					

OBJECTIVE 4. Develop and implement control methods against fungi involved in pear dieback and decline.



Control

Fungi : *Botryosphaeria dothidea*, *Botryosphaeria iberica*,
Sphaeropsis sapinae, *Cryptosporopsis species*, and
Botryosphaeria obtusa

Fungicides tested:

Vitiseal (1:10 dilution),

Mertect,

Orbit,

Rally+Topsin M+Vitiseal (1:10 dilution),

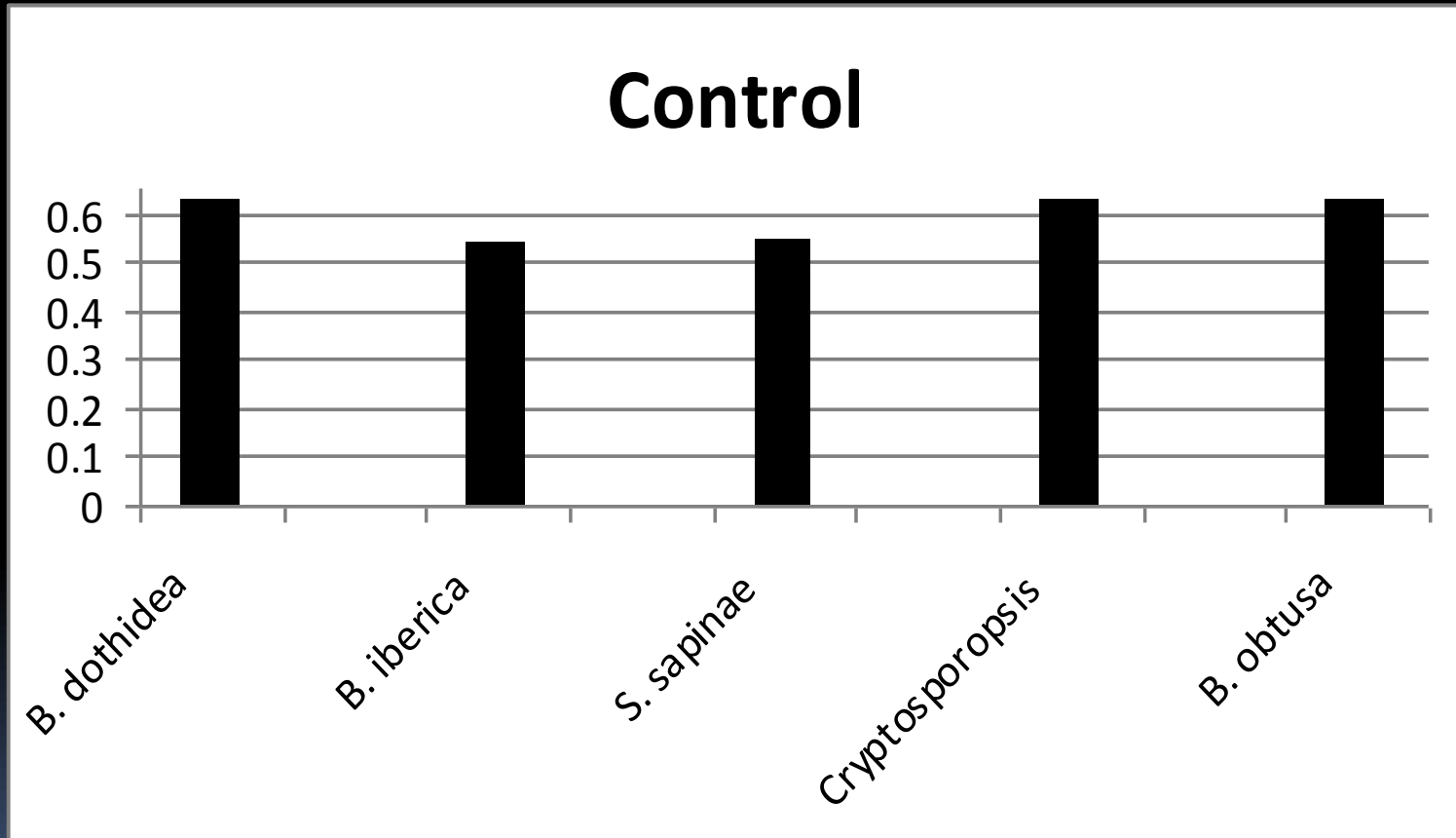
Rally+Topsin M,

Scholar,

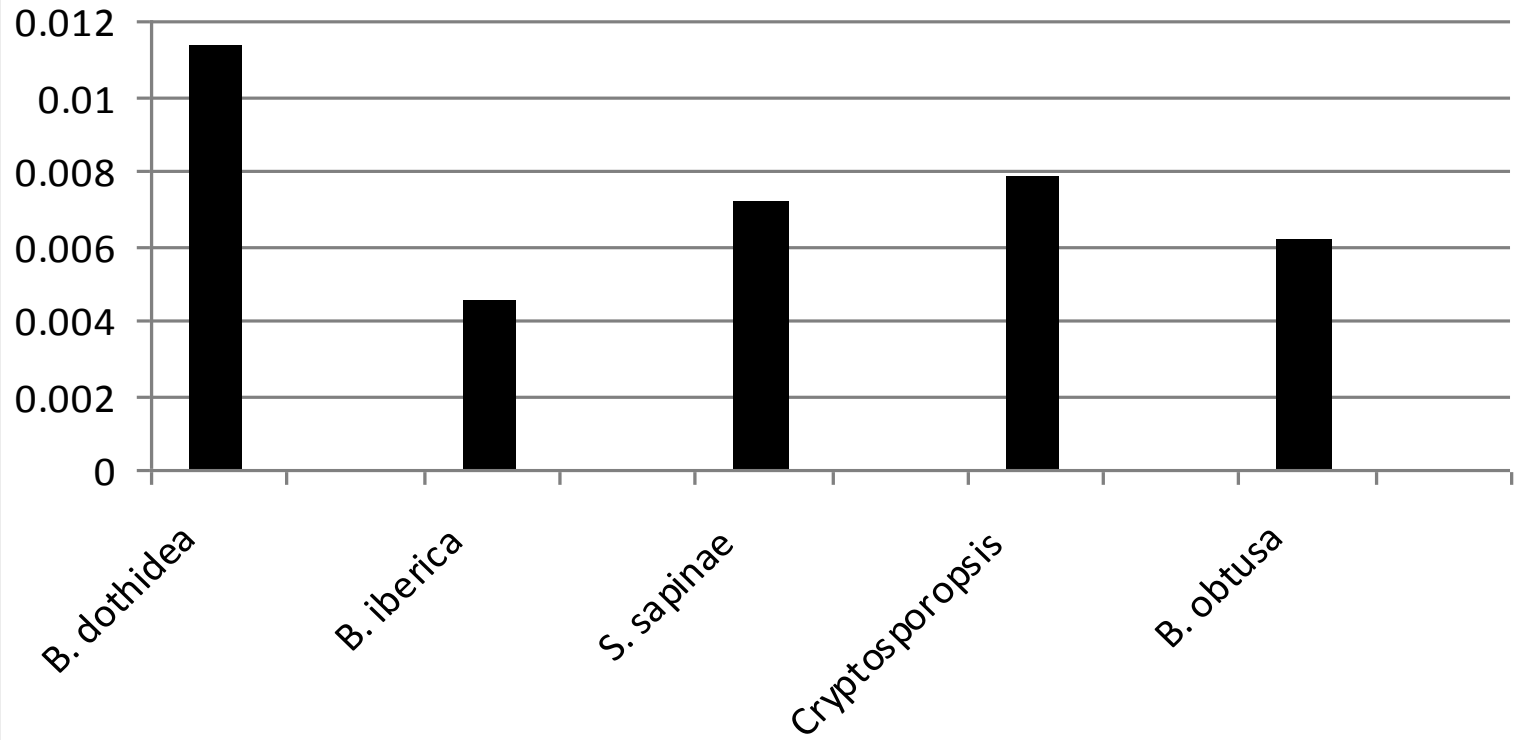
Luna Experience.



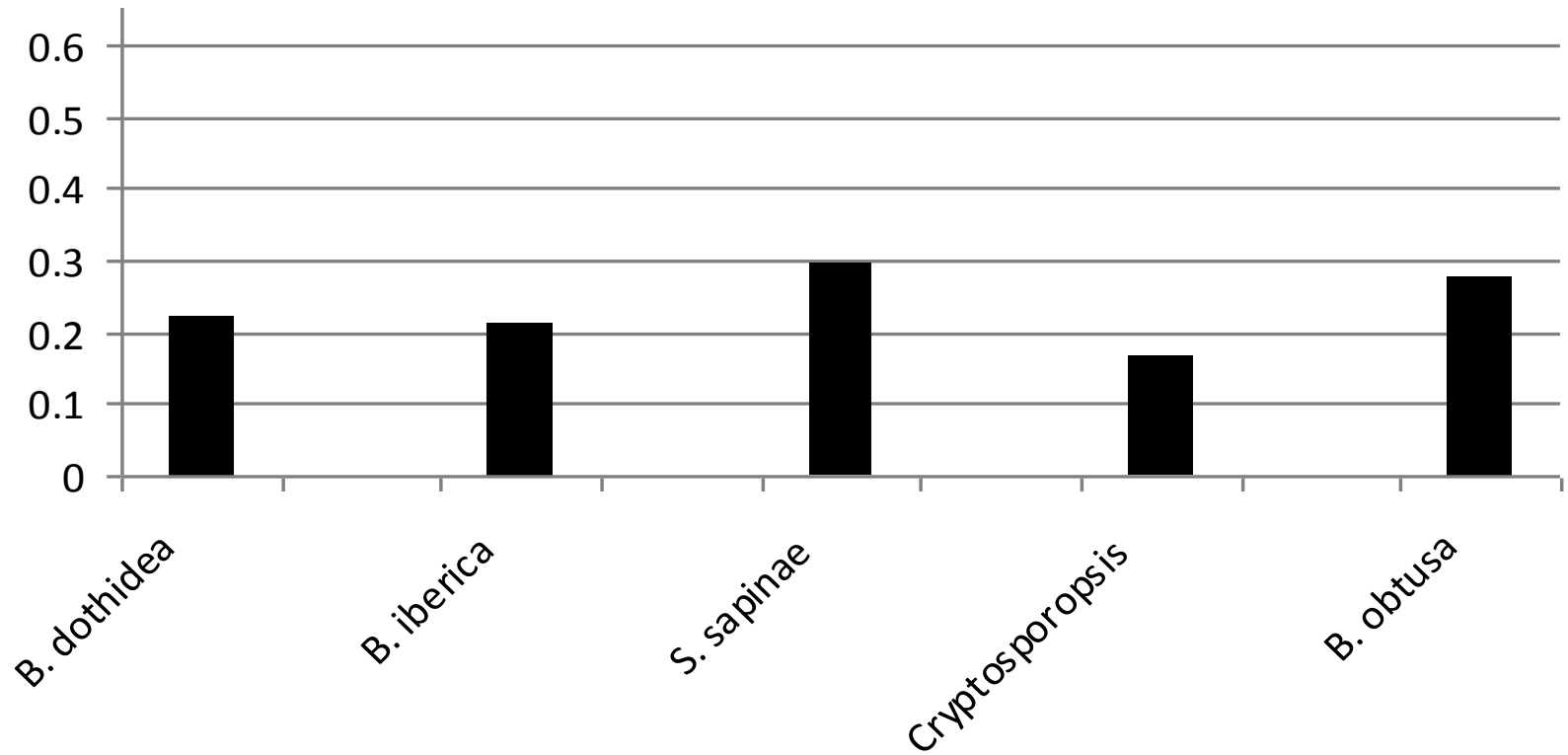
Results



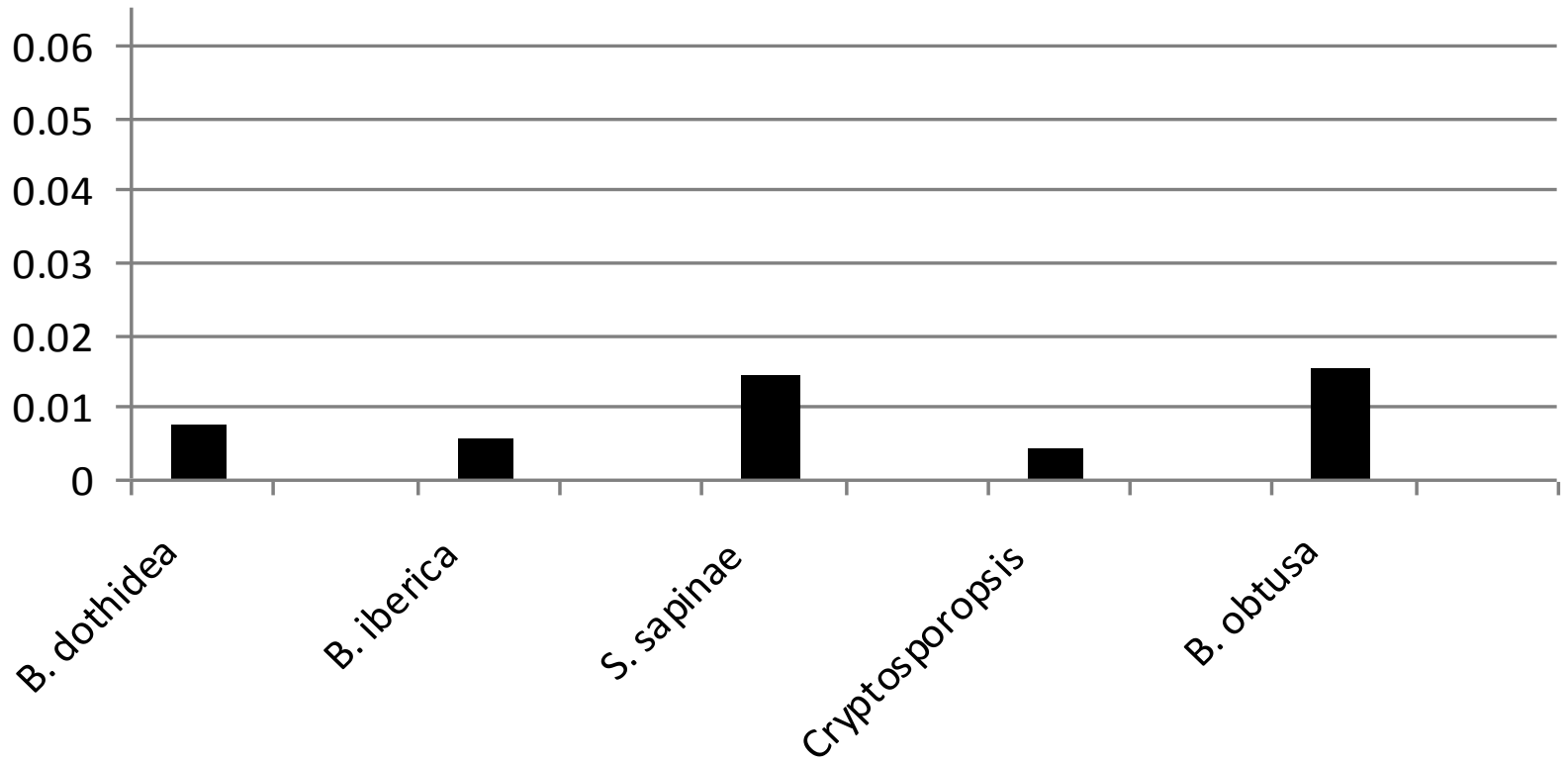
Rally, Topsin M and Vitiseal



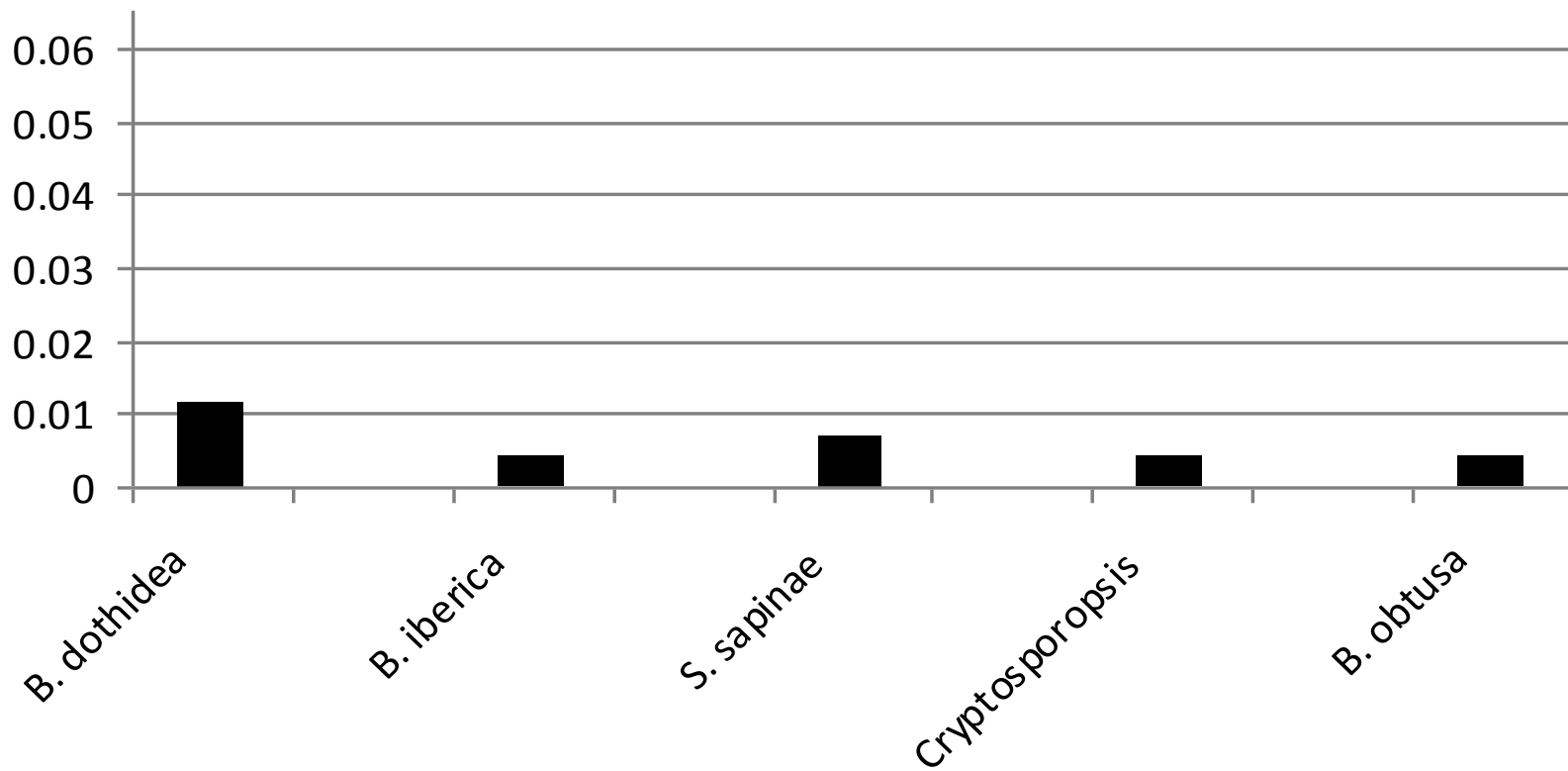
Mertect



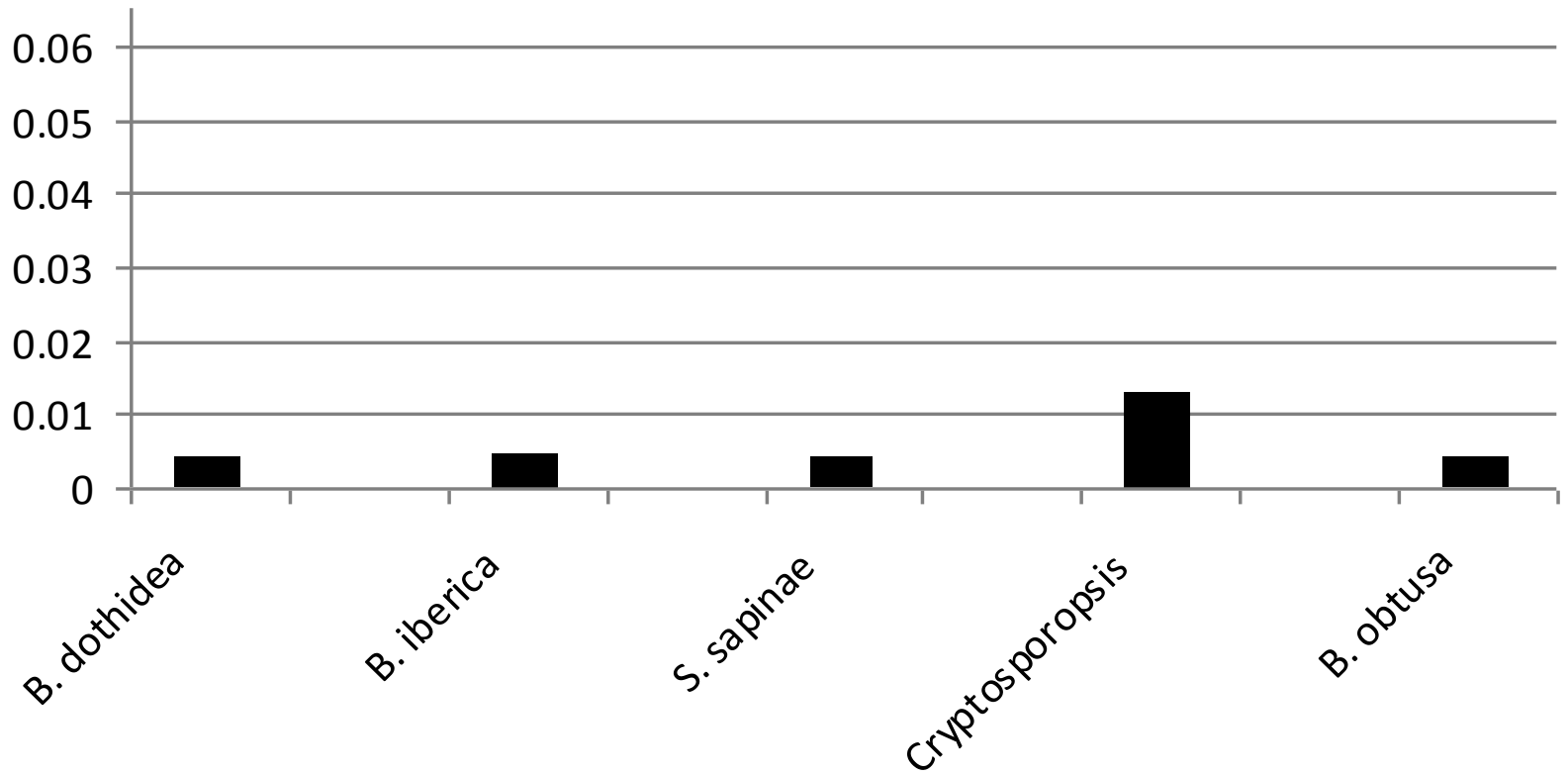
Orbit



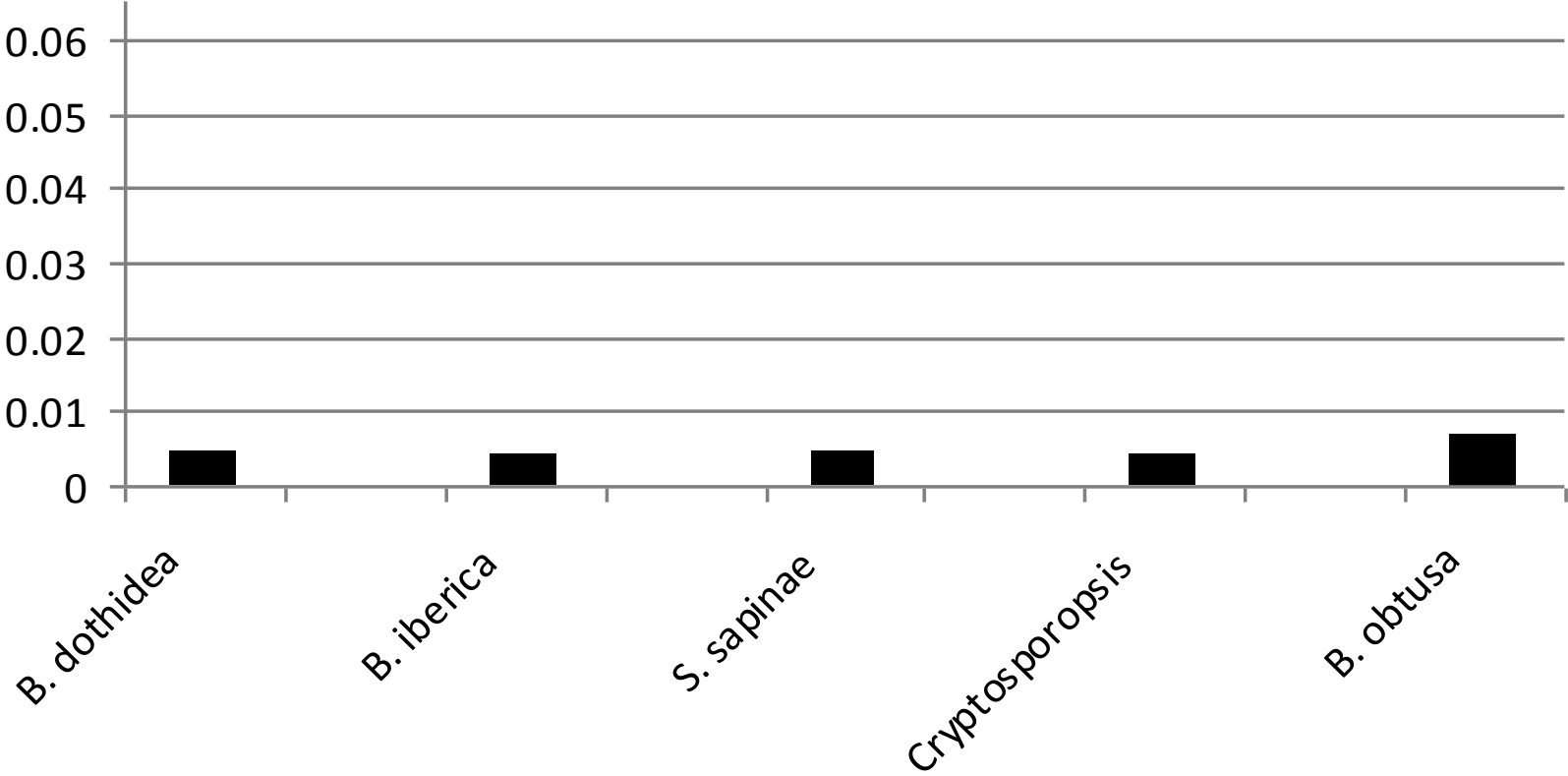
Rally and Topsin M



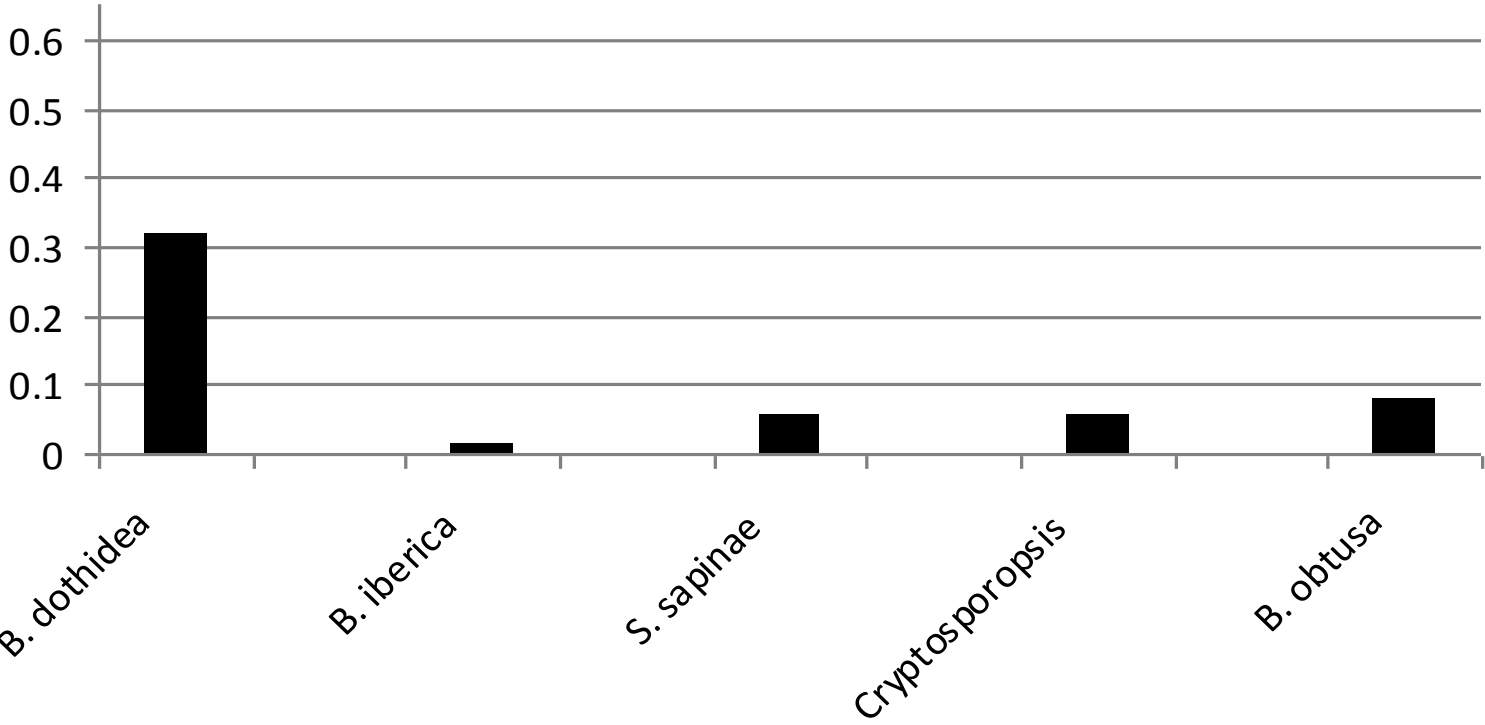
Scholar



Luna Experience



Vitiseal



- Thank you!!