

Evaluation of fungal populations as it relates to fruit rot incidence in Oregon

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Objectives

- Determine which fungi infect berries during their development and maturation
- Pre-harvest and post-harvest
- Three processed fruit beds in different locations
- Different fungicide programs

Experimental setup

- Three processed fruit beds
- All planted with 'Stevens'
- Pre-harvest samples – August 10, September 2, September 22
- Post-harvest samples – October 13, November 3, November 23
- Berries stored in cooler during the duration

Experimental setup (cont.)

- 100 healthy berries plated for all 6 samples in all 3 beds
- 50 or less rotted berries plated for the latter 5 samples in 3 beds
- Berries halved, surface sterilized in 10% Clorox, blotted dry on sterile paper towels
- Plated (5/plate) on acidified cornmeal agar
- Fungi identified at 21 days

Percent field rotted fruit – 2015

Bed #	Aug. 10	Sep. 2	Sep. 22	Total
1	0	0	1.1	0.51
2	0.2	0.8	1.2	0.77
3	0.3	0	0.6	0.41

Percent storage rotted fruit – 2015

Bed #	Oct. 13	Nov. 3	Nov. 23	Total
1	0.7	0.9	1.0	2.46
2	0.7	1.4	1.6	3.33
3	1.9	5.4	9.2	13.96

Fungicides applied – 2015

- 1 = (4) NuCop, Abound + Indar, Indar, Roper Rainshield (2.46% SR)
- 2 = (0) None (3.33% SR)
- 3 = (4) NuCop, Bravo, NuCop, Abound (13.96% SR)

Endophyte – a plant living within another plant, usually as a parasite (plant = fungus)

Latent pathogen

Latent infection

Black Rot – *Allantophomopsis*



Allantophomopsis in healthy berries

Bed	1	2	3
8/10	5	4	19
9/02	11	5	9
9/22	15	8	14
10/13	10	6	9
11/03	14	5	8
11/23	14	4	5

Healthy

**Ripe Rot –
*Coleophoma***



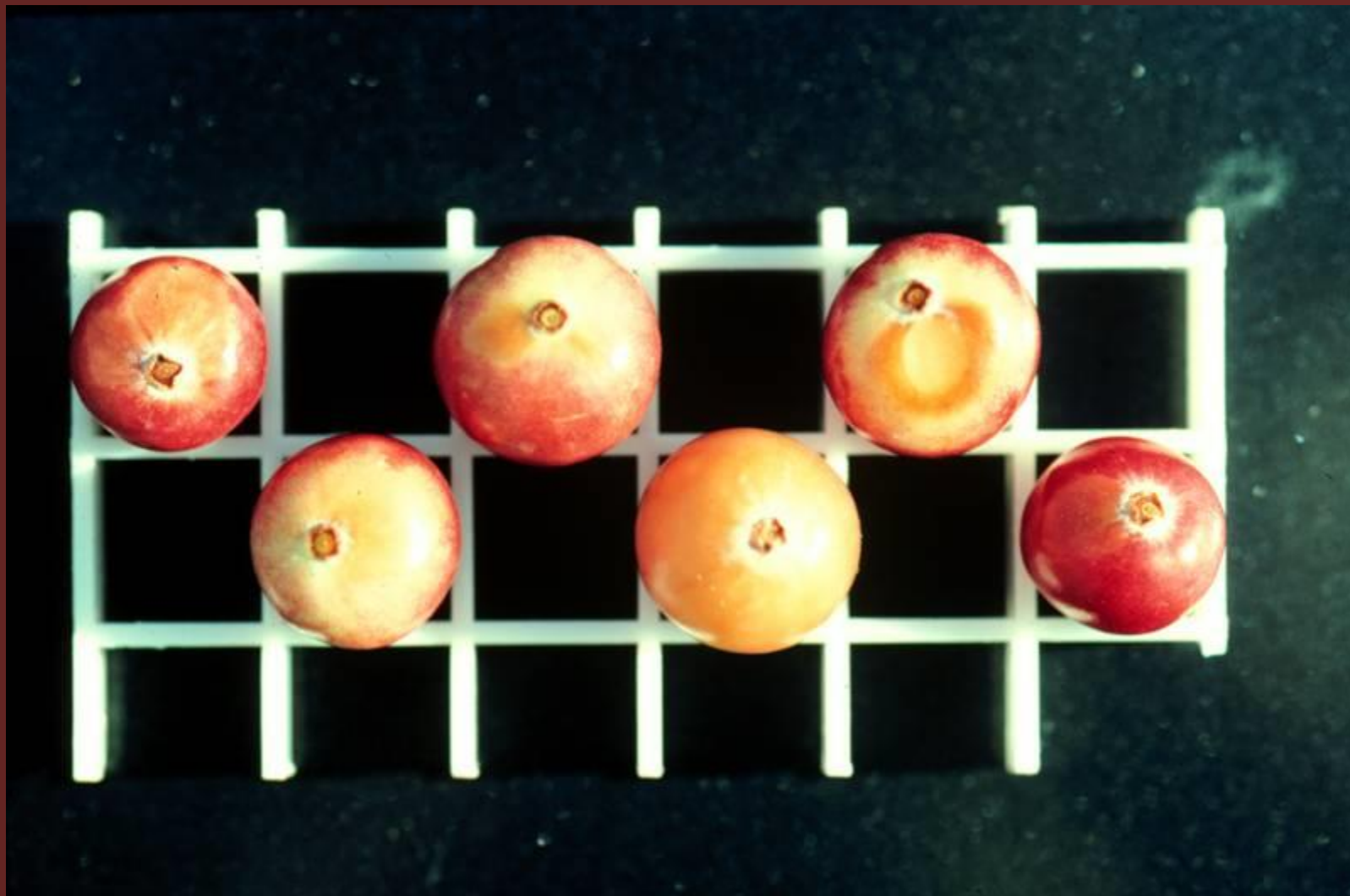
Coleophoma in healthy berries

Bed	1	2	3
8/10	1	4	0
9/02	0	4	0
9/22	0	0	0
10/13	1	0	1
11/03	2	1	0
11/23	5	0	0

Colletotrichum in healthy berries

Bed	1	2	3
8/10	7	15	0
9/02	6	6	1
9/22	3	14	1
10/13	3	11	0
11/03	0	15	1
11/23	0	21	0

End Rot – *Fusicoccum*



Fusicoccum in healthy berries

Bed	1	2	3
8/10	0	10	42
9/02	1	6	25
9/22	0	19	36
10/13	3	11	39
11/03	0	14	42
11/23	1	12	21

Phomopsis in healthy berries

Bed	1	2	3
8/10	7	5	15
9/02	9	3	8
9/22	2	8	15
10/13	7	9	13
11/03	16	7	14
11/23	3	12	18

Physalospora in healthy berries

Bed	1	2	3
8/10	7	41	11
9/02	33	61	22
9/22	26	36	33
10/13	31	39	26
11/03	21	17	11
11/23	17	14	15

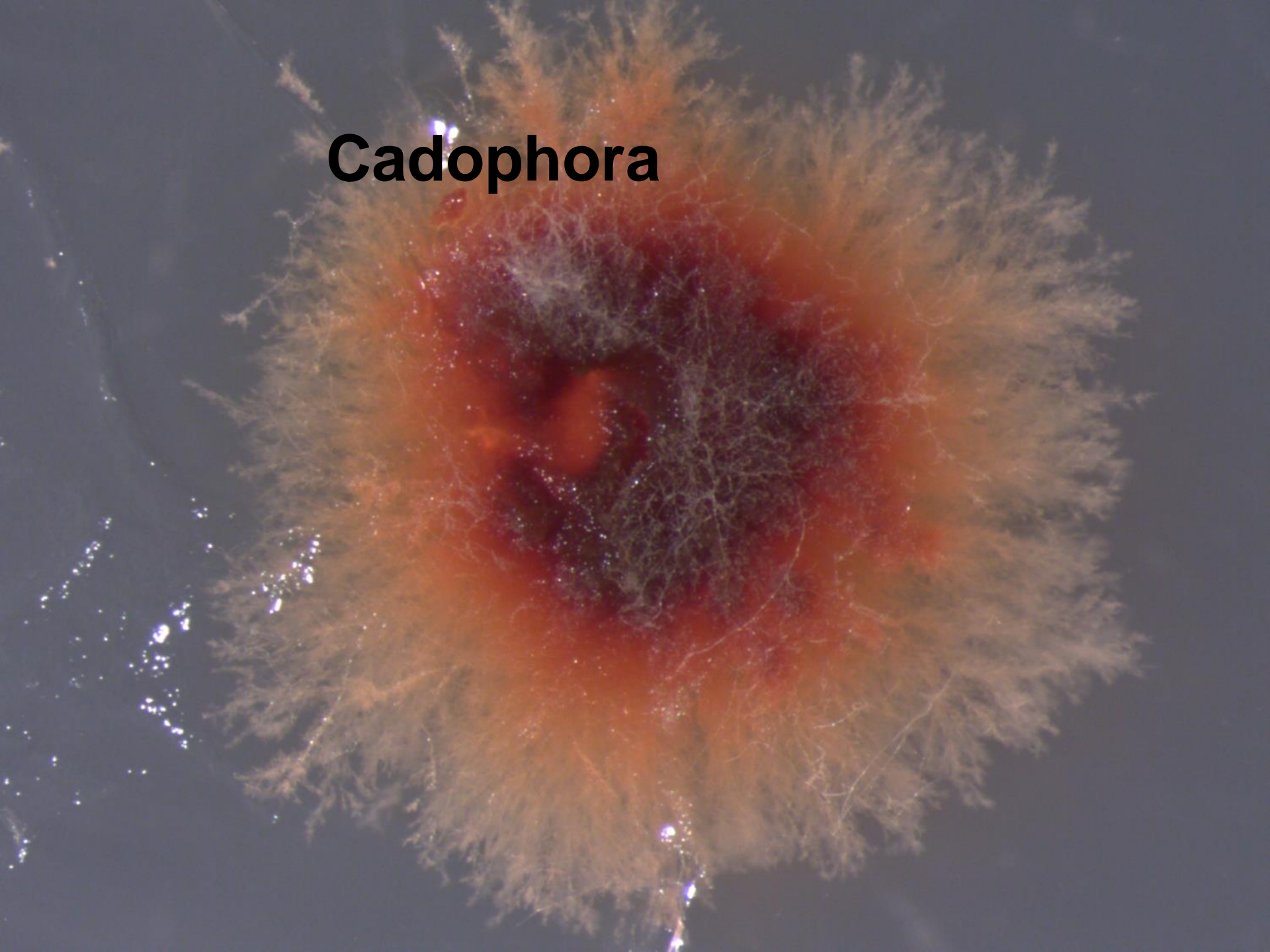
“Yellow spreading”



Cryptosporiopsis



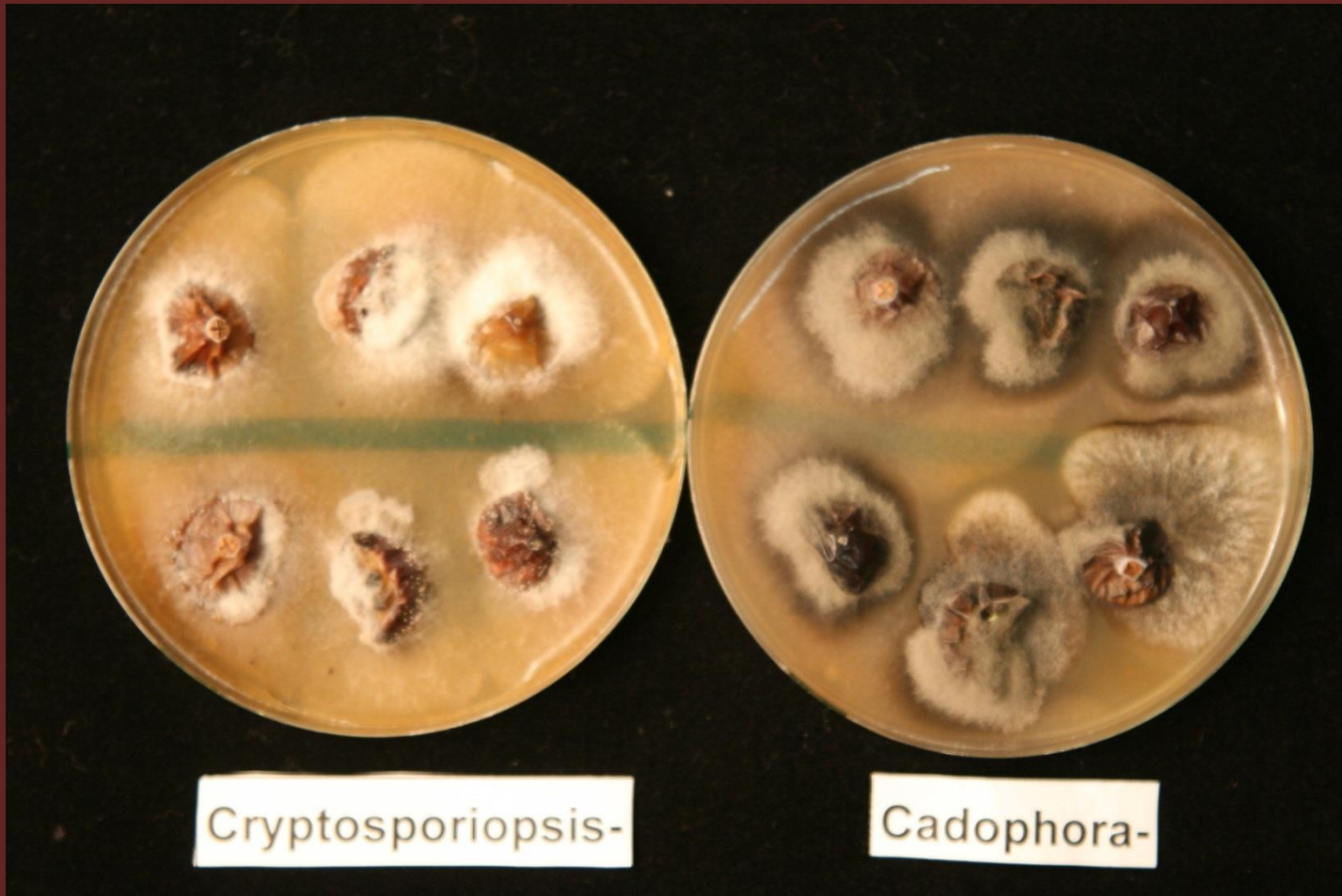
Cadophora



Inoculation chambers with infected fruit



Re-isolation



“Yellow-spreading” in healthy berries

Bed	1	2	3
8/10	4	4	1
9/02	11	8	2
9/22	9	3	2
10/13	13	8	1
11/03	17	12	0
11/23	19	5	2

Sterile healthy berries

Bed	1	2	3
8/10	57	12	15
9/02	27	12	35
9/22	38	12	13
10/13	26	18	17
11/03	23	15	19
11/23	38	26	18

Allantophomopsis in rotted berries

Bed	1	2	3
8/10	---	---	---
9/02	---	40	---
9/22	45	17	11
10/13	80	46	26
11/03	65	13	42
11/23	60	0	24

Coleophoma in rotted berries

Bed	1	2	3
8/10	---	---	---
9/02	---	0	---
9/22	30	26	56
10/13	5	0	19
11/03	12	0	24
11/23	16	0	10

Colletotrichum in rotted berries

Bed	1	2	3
8/10	---	---	---
9/02	---	60	---
9/22	3	43	11
10/13	0	23	0
11/03	0	22	0
11/23	0	8	4

Fusicoccum in rotted berries

Bed	1	2	3
8/10	---	---	---
9/02	---	0	---
9/22	0	9	11
10/13	0	8	30
11/03	8	26	24
11/23	12	44	32

Phomopsis in rotted berries

Bed	1	2	3
8/10	---	---	---
9/02	---	0	---
9/22	0	4	0
10/13	0	8	0
11/03	8	0	4
11/23	4	4	4

Physalospora in rotted berries

Bed	1	2	3
8/10	---	---	---
9/02	---	0	---
9/22	18	22	0
10/13	0	15	4
11/03	8	17	16
11/23	0	0	4

“Yellow-spreading” in rotted berries

Bed	1	2	3
8/10	---	---	---
9/02	---	0	---
9/22	0	0	0
10/13	0	0	0
11/03	0	4	0
11/23	0	4	0

Sterile rotted berries

Bed	1	2	3
8/10	---	---	---
9/02	---	0	---
9/22	18	4	33
10/13	15	8	11
11/03	8	13	6
11/23	25	40	30

Fungi which cause fruit rot in Oregon – 2015

- Allantophomopsis*
- Botryosphaeria
- Botrytis
- Cadophora*
- Coleophoma*
- Colletotrichum**
- Cryptosporiopsis*
- Fusicoccum**
- Penicillium
- Pestalotia
- Phomopsis*
- Phyllosticta
- Physalospora**
- Synchronoblastia

Fungi which cause fruit rot in British Columbia – 2014-15

- Allantophomopsis**
- Botryosphaeria
- Botrytis
- Coleophoma**
- Colletotrichum*
- Fusicoccum*
- Penicillium
- Pestalotia
- Phomopsis
- Phyllosticta
- Physalospora**
- Synchronoblastia

Fungi which cause fruit rot in Washington – 2013-5

- Allantophomopsis**
- Botryosphaeria
- Cadophora*
- Coleophoma**
- Colletotrichum**
- Cryptosporiopsis*
- Fusicoccum*
- Penicillium
- Pestalotia
- Phomopsis
- Phyllosticta
- Physalospora**

Conclusions

- Very small sampling – only three beds, only ‘Stevens’ utilized in study
- Very little fruitworm injury
- Significantly less field and storage rot than WA or BC
- No cottonball observed (as for WA, BC)

Conclusions

- *Allantophomopsis* – very few black berries; most were poppers (hard to discern from berries with *Coleophoma*, *Fusicoccum*)
- *Fusicoccum* – no pink isolates, all yellow (unlike MA)
- *Colletotrichum* – most *C. acutatum*, but *C. gloeosporioides* was also present (unlike WA, BC)
- No *Phyllosticta vaccinii* (key pathogen in MA, NJ)
- *Cryptosporiopsis*, *Cadophora* – how important are these genera?











Scarlet Knight Primary Berries (Healthy)

Fungus	9/3	9/22	10/13
Allanto	25	27	25
Clad	11	6	3
Coleo	0	1	1
Colleto	1	0	1
Fusic	3	2	1
Phom	5	2	5
Physal	27	16	31
YS	10	10	3
Unident	3	5	10
Sterile	25	30	32

Scarlet Knight Secondary Berries (Healthy)

Fungus	9/3	9/22	10/13
Allanto	11	21	32
Clad	26	8	2
Coleo	0	20	4
Colleto	0	0	1
Fusic	3	3	3
Phom	18	26	31
Physal	8	6	4
YS	0	3	8
Unident	27	16	12
Sterile	15	9	9

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Questions?

