





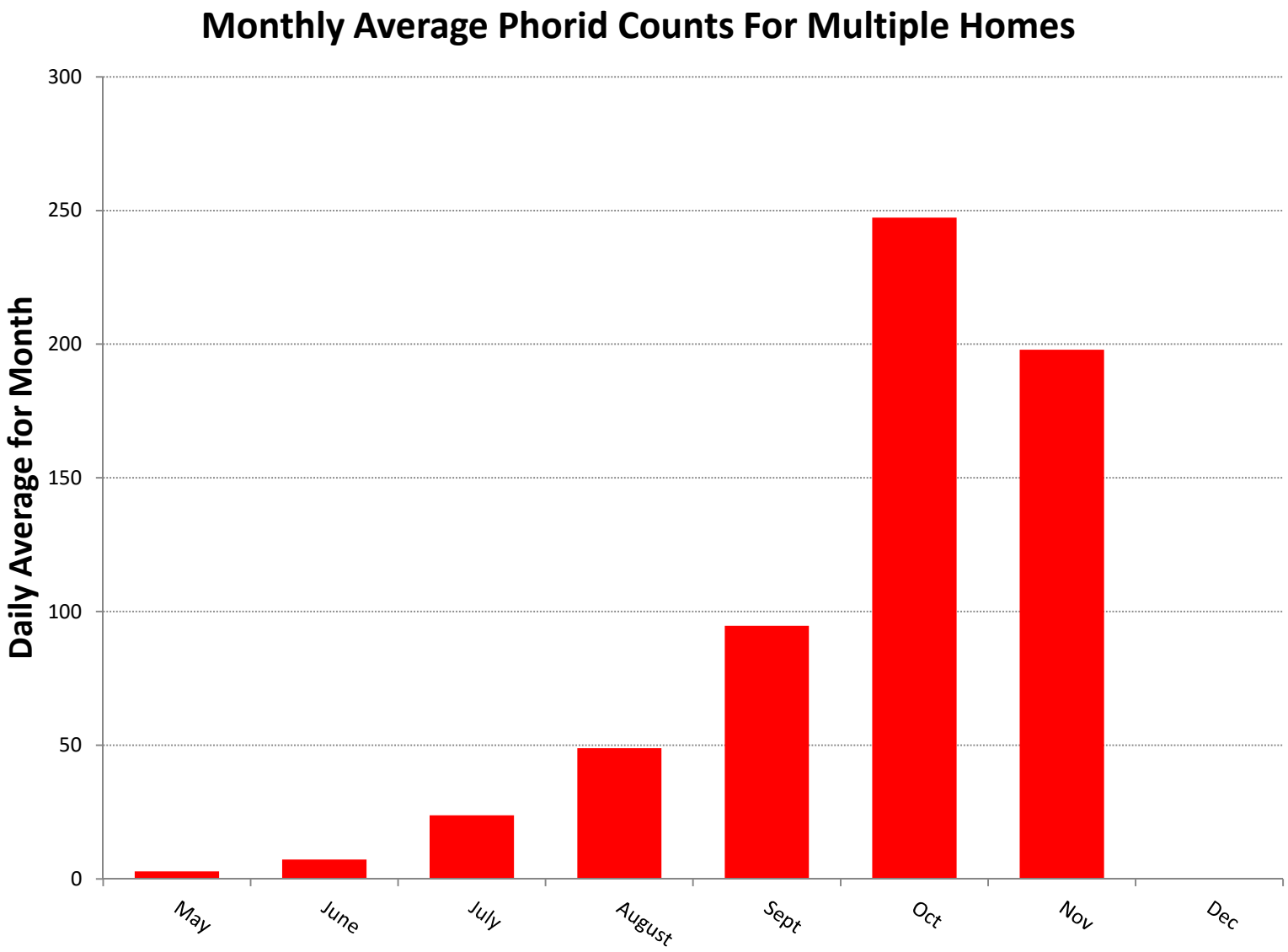

Agenda

1. Introduction
2. What we have done
3. What we know and have observed
4. What we do not know
5. Control measures
6. Source of the problem
7. Penn State
8. Going forward
9. Discussion

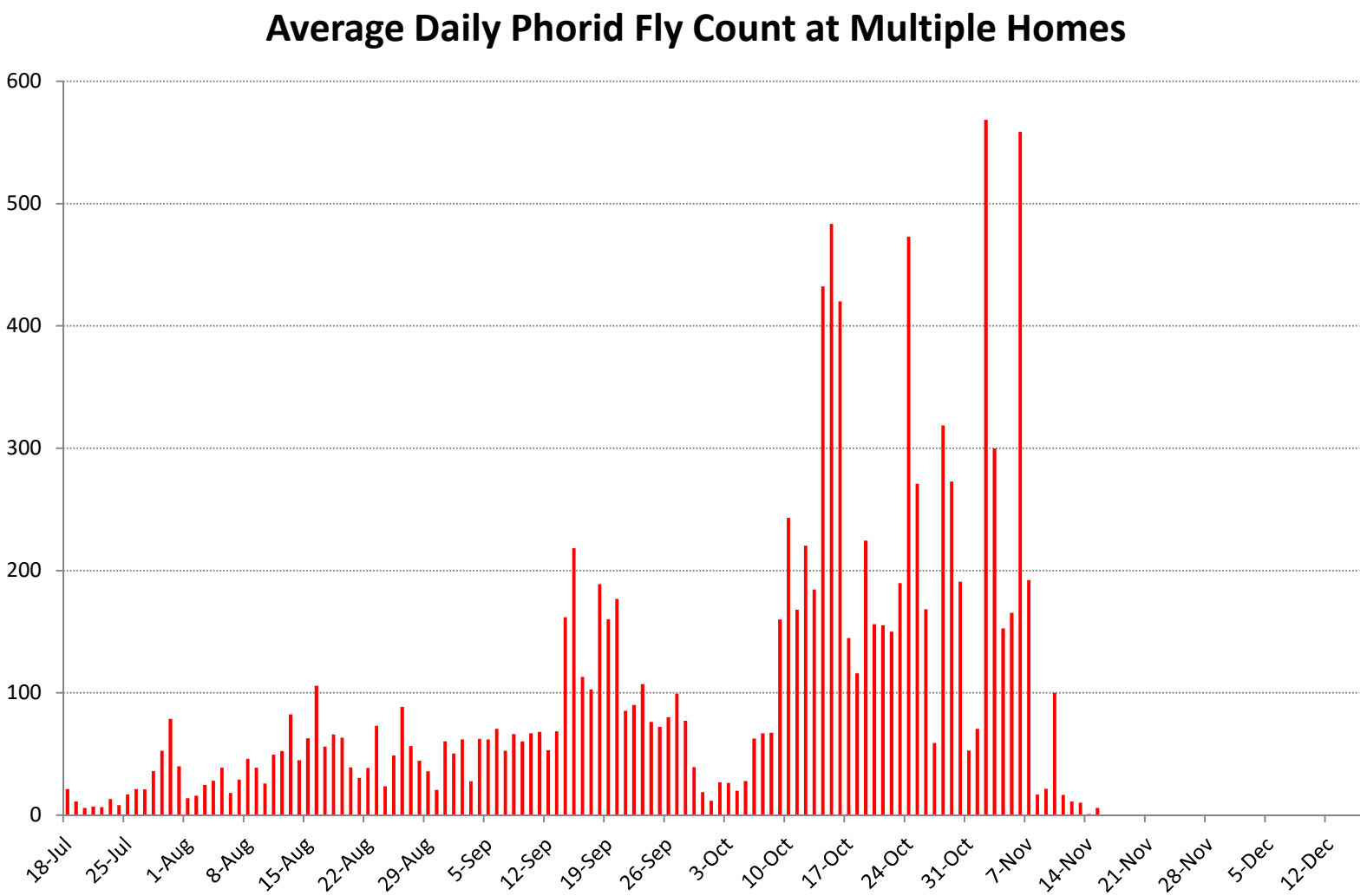
What We Have Done

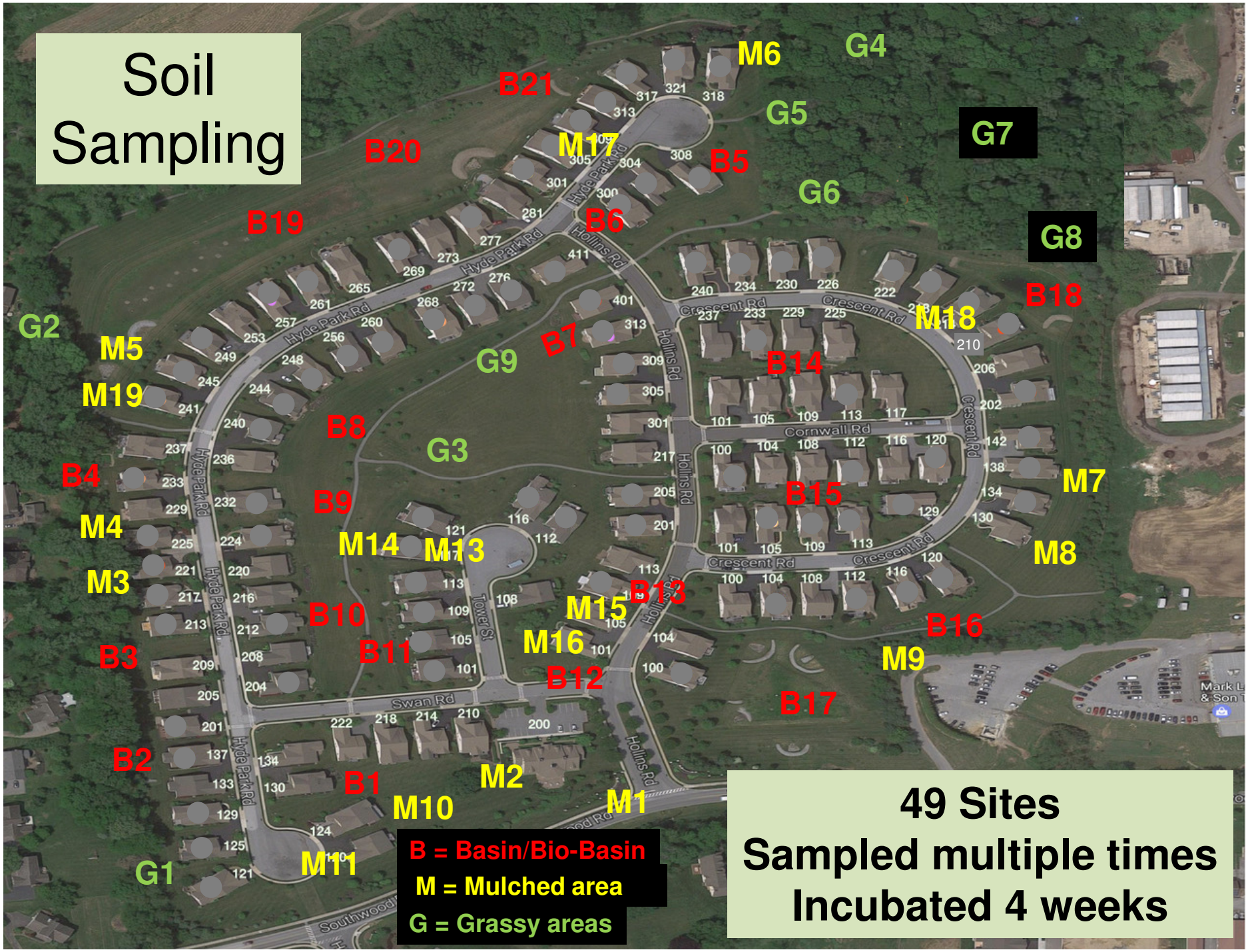
1. Collect home owner counts to profile the problem over time
2. Over 200 soil samples to determine if the source of the problem is internal to Harrogate
3. Monthly air sampling at 20 – 30 sites
4. Continuous air sampling at three sites
5. Ran a major test spraying the exterior of homes
6. Repellent tests
7. Homeowner interviews
8. Linked the problem to the mushroom farms

In Home Counts Are Increasing



In Home Counts Vary A Lot




Soil Sampling
B21
M6
G4
G5
G7
B20
M17
B5
G6
B19
B6
G8
B18
G2
M5
M19
G9
B7
M18
B14
B8
G3
B4
M7
B9
B15
M4
M14
M13
M8
M3
B13
B10
M15
B16
M16
M9
B3
B11
B12
B17
B2
B1
M2
M10
M1
G1
M11
B = Basin/Bio-Basin
M = Mulched area
G = Grassy areas
49 Sites
Sampled multiple times
Incubated 4 weeks

Soil Sampling Results

Zilch

Nuthin

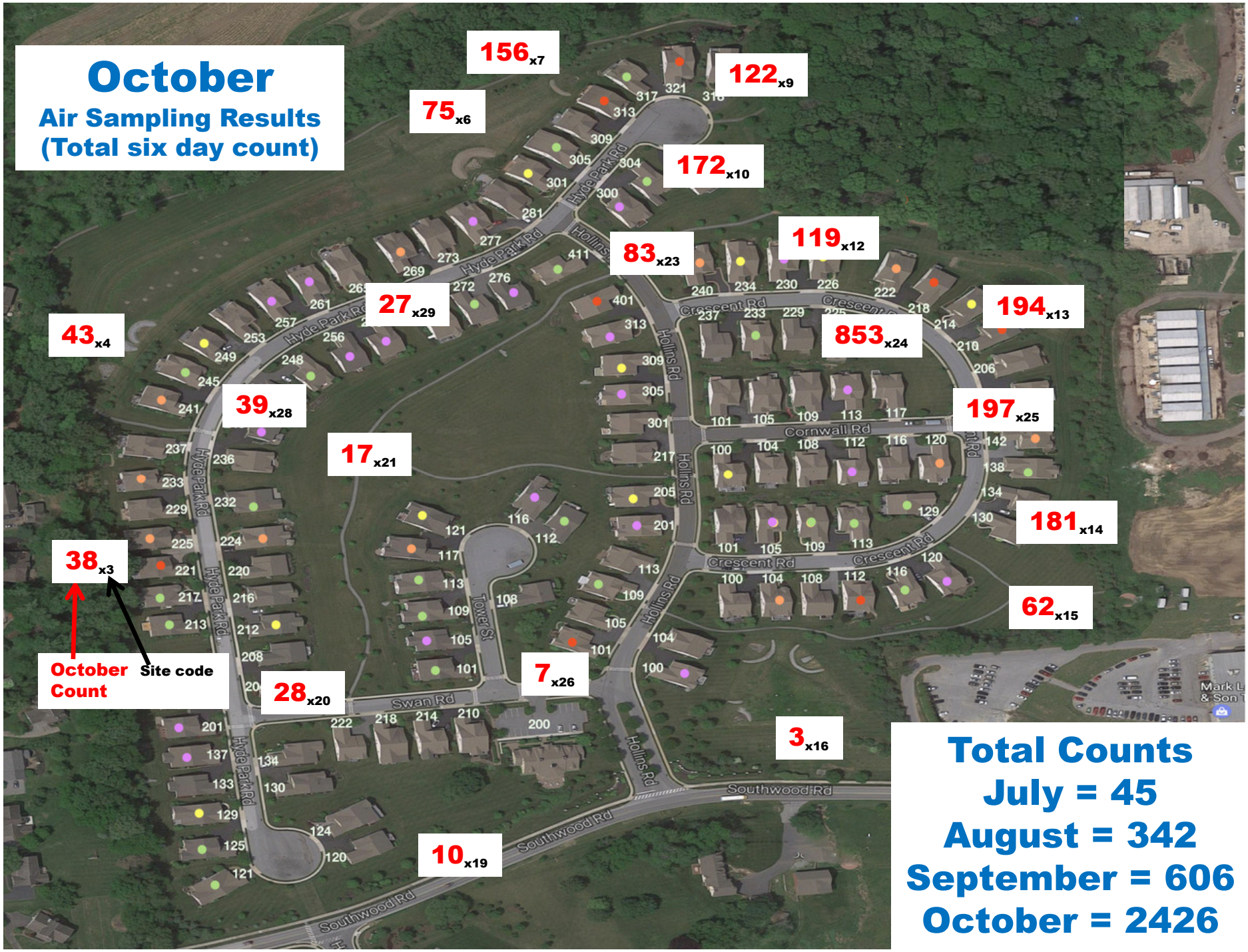
0

Zero

Zip

Nada

The phorid flies in our homes Are NOT coming from breeding Within our community



Total Counts

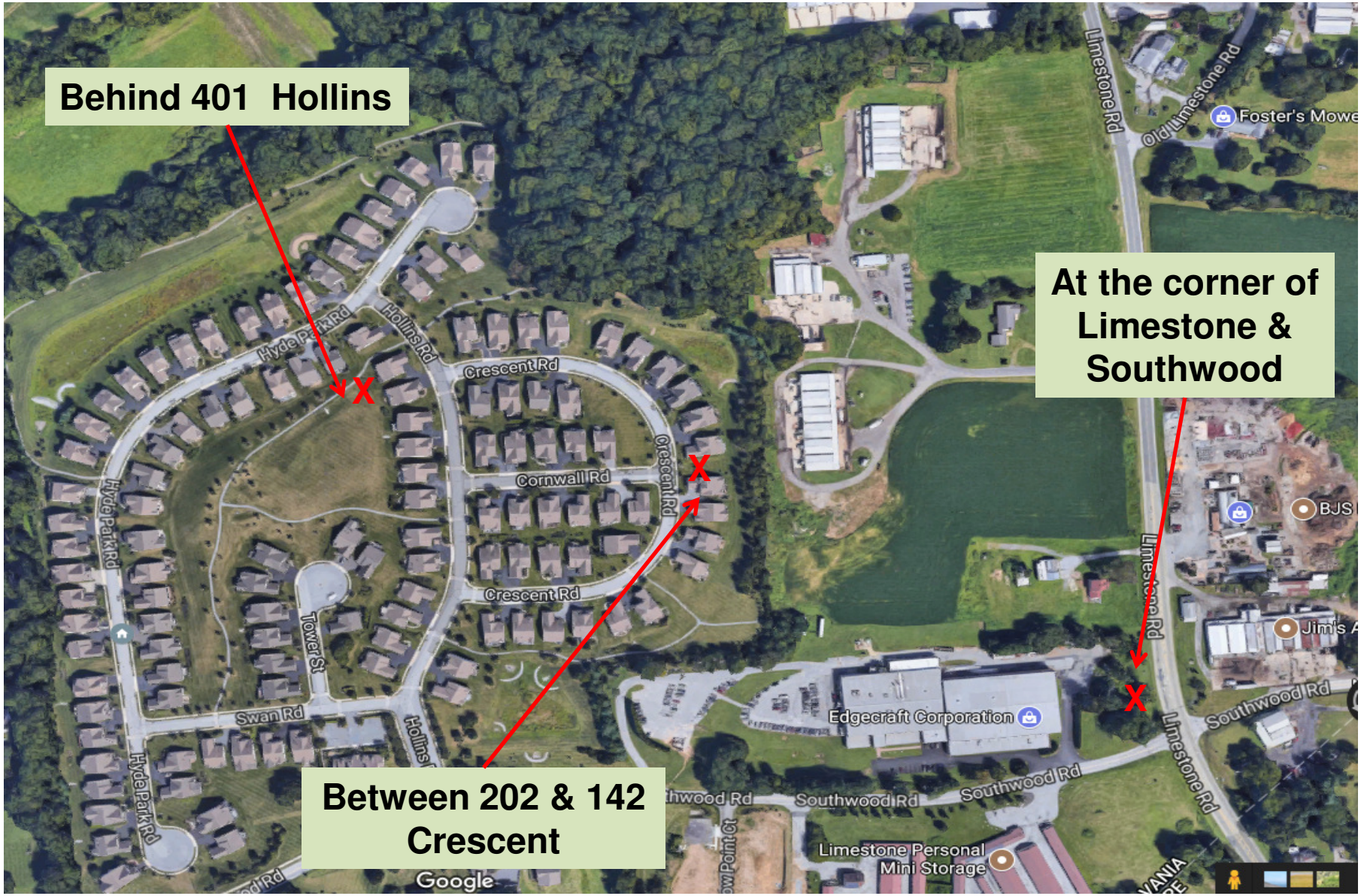
July = 45

August = 342

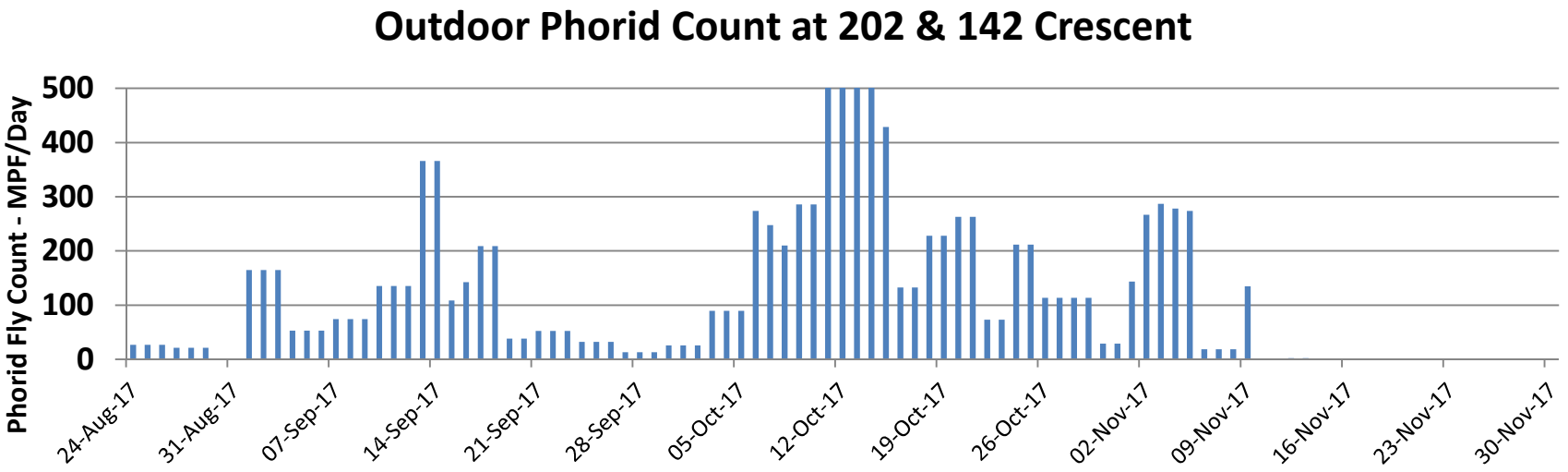
September = 606

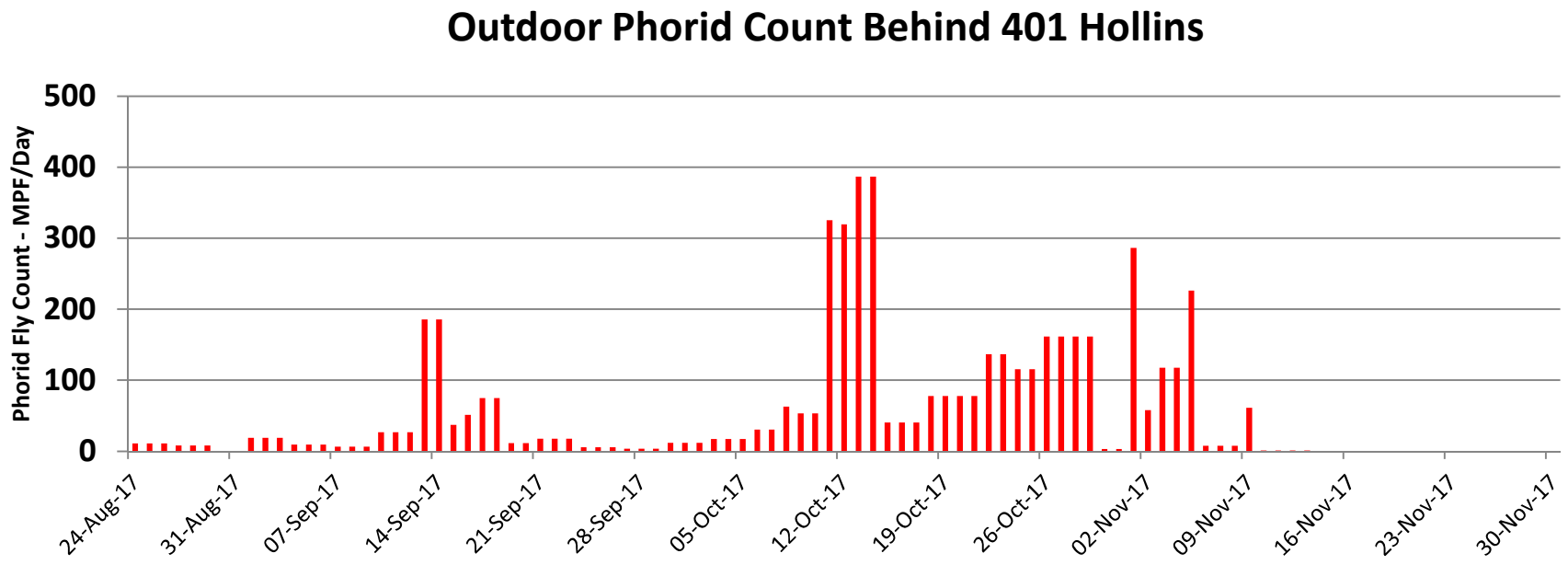
October = 2426

Three Continuous Air Sample Sites

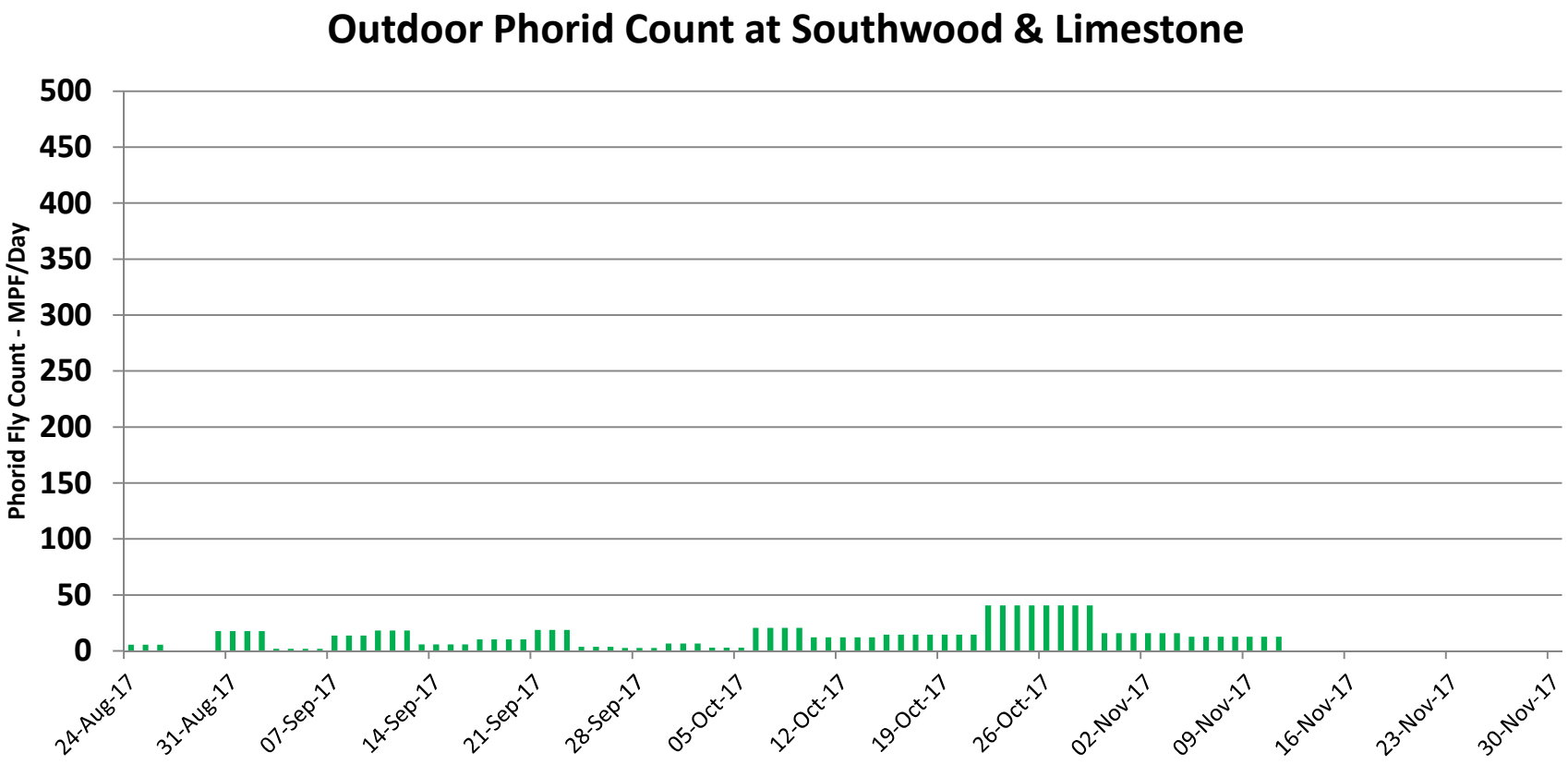


Results of Continuous Air Sampling





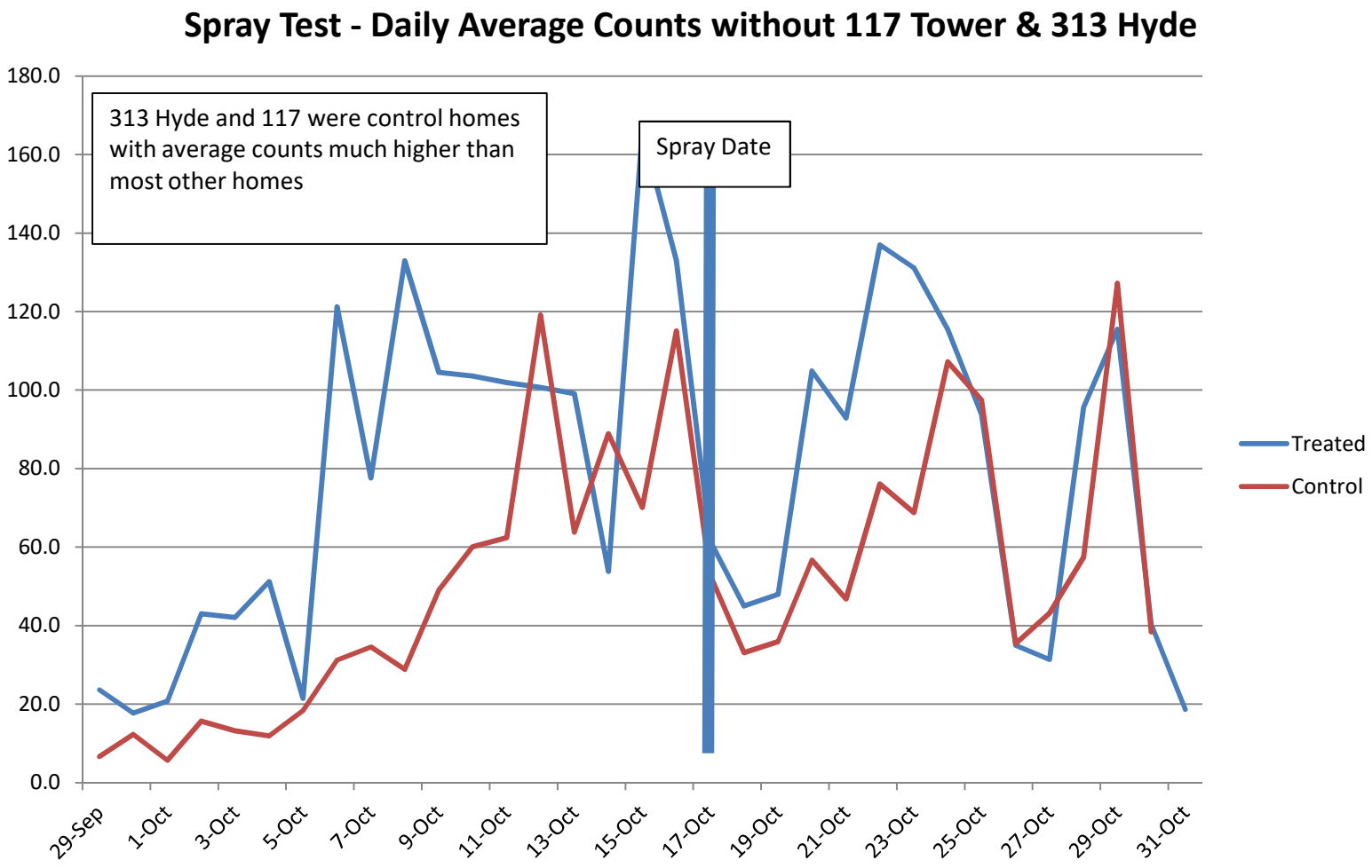
Results of Continuous Air Sampling



Spray Test

1. Objective = determine if an insecticide can kill or block the phorid flies as they enter our homes
2. Large scale test of about 25 homes
3. 13 treated; the rest untreated
4. Wanted to see a big drop in the treated homes
5. Started with an 18 day “base line” period 29-Sept
6. Sprayed 13 homes on 17-Oct
7. Completed the test 13 days later on 31-Oct

Spray Test


Spray Test - Daily Average Counts without 117 Tower & 313 Hyde
313 Hyde and 117 were control homes with average counts much higher than most other homes
Spray Date
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
29-Sep
1-Oct
3-Oct
5-Oct
7-Oct
9-Oct
11-Oct
13-Oct
15-Oct
17-Oct
19-Oct
21-Oct
23-Oct
25-Oct
27-Oct
29-Oct
31-Oct
Treated
Control

Spray Test Comparisons

(Numbers = Daily Counts)

Treated Homes				Control Homes		
Home	**Before**	**After**		**Home**	**Before**	**After**
1xx Hyde	15	16	Little or No Change	1xx Hyde	40	65
3xx Hyde	10	11		2xx Hyde	66	63
3xx Hyde	18	34		1xx Cornwall	69	50
1xx Cornwall	15	23		1xx Tower	170	191
				2xx Crescent	72	56
				2xx Crescent	1	3
2xx Hyde	63	193	Counts Increase	2xx Hyde	75	116
2xx Hyde	64	241		2xx Hyde	83	130
2xx Hollins	108	191		3xx Hyde	11	59
				3xx Hyde	406	1353
2xx Crescent	394	230	Counts Drop			
1xx Crescent	35	9				

Spray Test

1. Results:
    A. Some sprayed homes went up, some stayed the same
    B. Two sprayed homes saw some improvement
    C. Some “control” homes went up, some stayed the same
2. Conclusion - Bifenthrin does not provide good control, but it may help high count homes

What We Know

1. **Counts increase with time – both indoors and outside**
2. **Indoor counts vary widely home to home**
3. **Spikes happen –indoors and outside follow in lockstep**
4. **Soil sampling – ZERO phorid flies**
5. **Higher outdoor counts closer to the mushroom farms**
6. **Low counts at Southwood and Limestone**

Team Observations

1. Wide variation in individual perceptions
2. Open doors and windows = high counts
3. Vacations generally mean low counts
4. They probably infiltrate our homes more than realized
5. Homeowner interviews showed no obvious differences between high and low count homes.

What We Do Not Know

1. Why phorid flies enter our homes
2. How they enter our homes
3. Why individual homes are so different

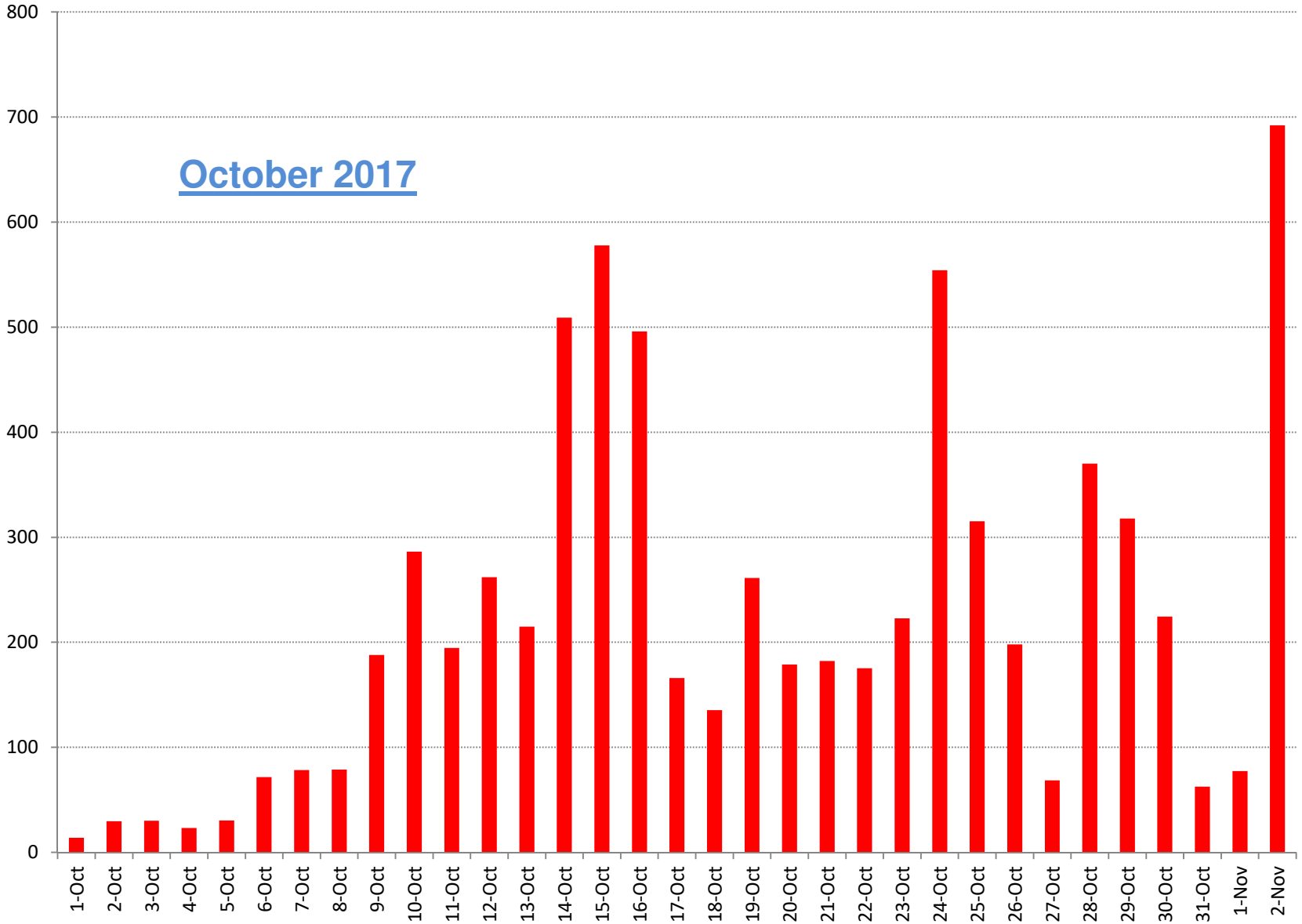
Current Knowledge About Control

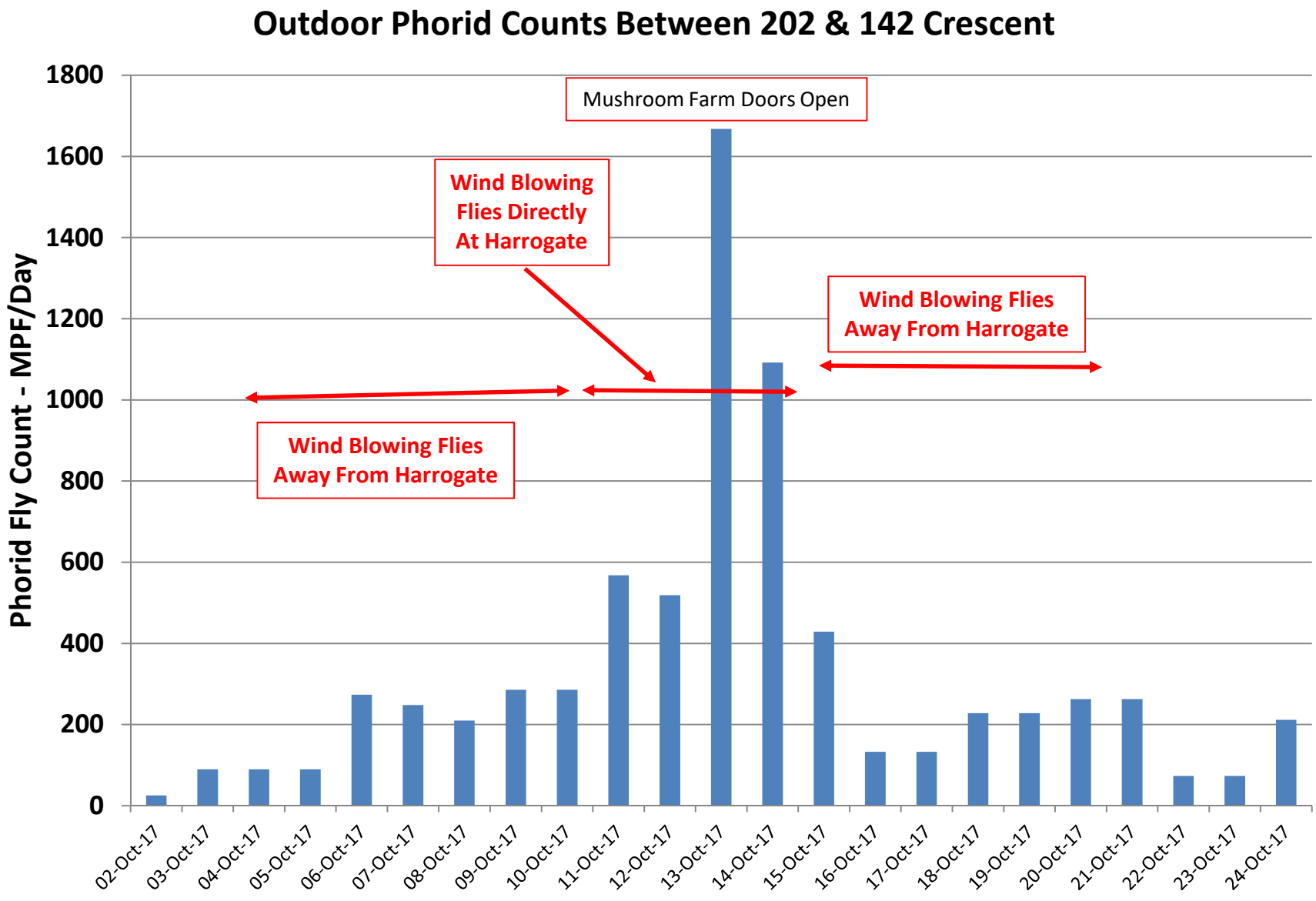
1. **Fly lights are the best available technology**
2. **Exterior treatment with bifenthrin may reduce counts, but does not control phorid flies**
3. **Ditto Cedarcide PCO**
4. **Repellants have shown some reduction in counts, but do not provide good control of the problem**

The Source of the Phorid Flies

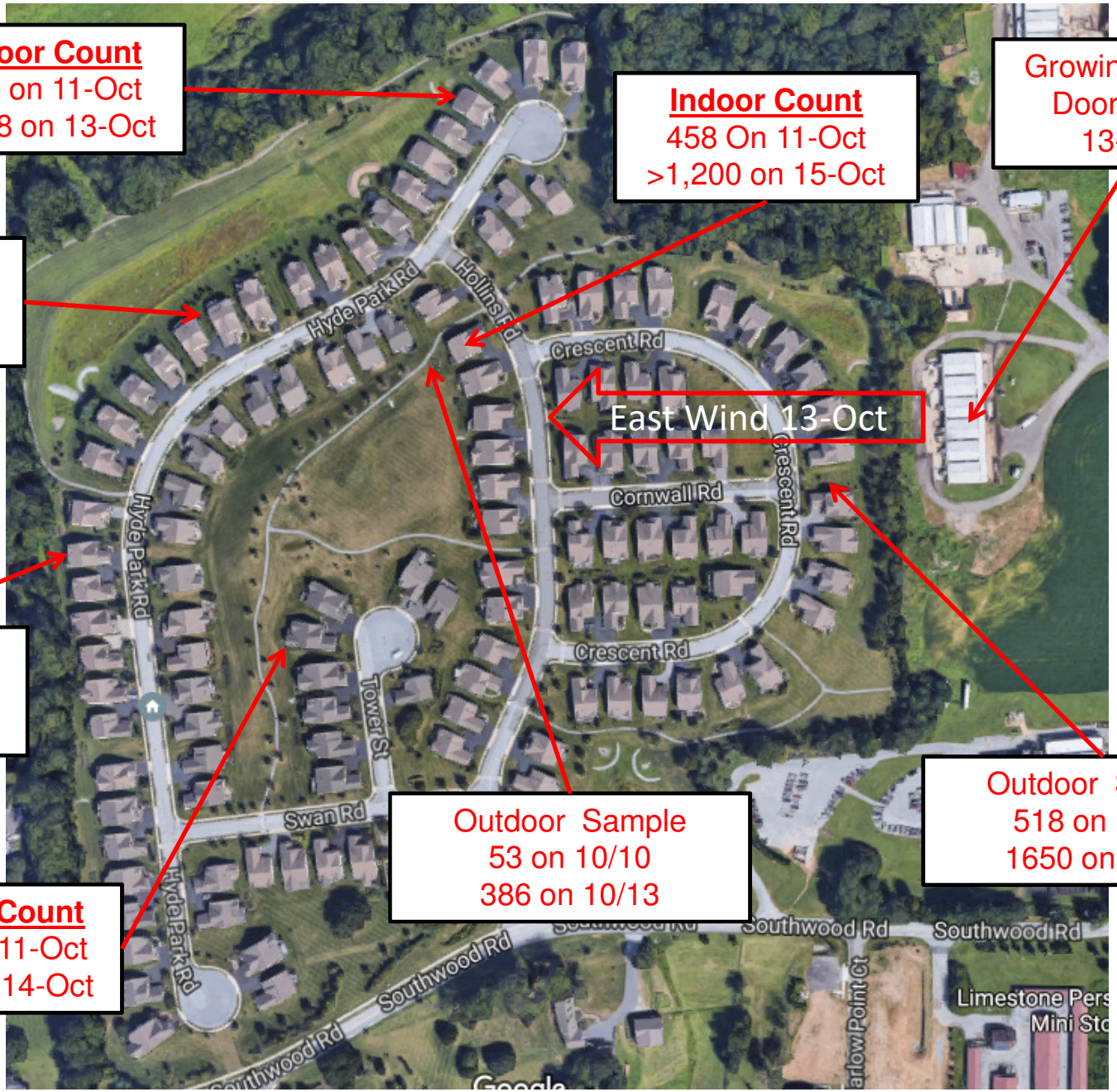
It is the mushroom farms

Average Daily Phorid Fly Count at Multiple Homes




Outdoor Phorid Counts Between 202 & 142 Crescent
Phorid Fly Count - MPF/Day
1800
1600
1400
1200
1000
800
600
400
200
0
Mushroom Farm Doors Open
Wind Blowing Flies Directly At Harrogate
Wind Blowing Flies Away From Harrogate
Wind Blowing Flies Away From Harrogate
02-Oct-17
03-Oct-17
04-Oct-17
05-Oct-17
06-Oct-17
07-Oct-17
08-Oct-17
09-Oct-17
10-Oct-17
11-Oct-17
12-Oct-17
13-Oct-17
14-Oct-17
15-Oct-17
16-Oct-17
17-Oct-17
18-Oct-17
19-Oct-17
20-Oct-17
21-Oct-17
22-Oct-17
23-Oct-17
24-Oct-17

Phorid Fly "Attack" October 13 - 15, 2017



Indoor Count
251 on 11-Oct
2,038 on 13-Oct

Indoor Count
458 On 11-Oct
>1,200 on 15-Oct

Growing Room
Door Open
13-Oct

Indoor Count
172 on 11-Oct
1,064 on 14-Oct

East Wind 13-Oct

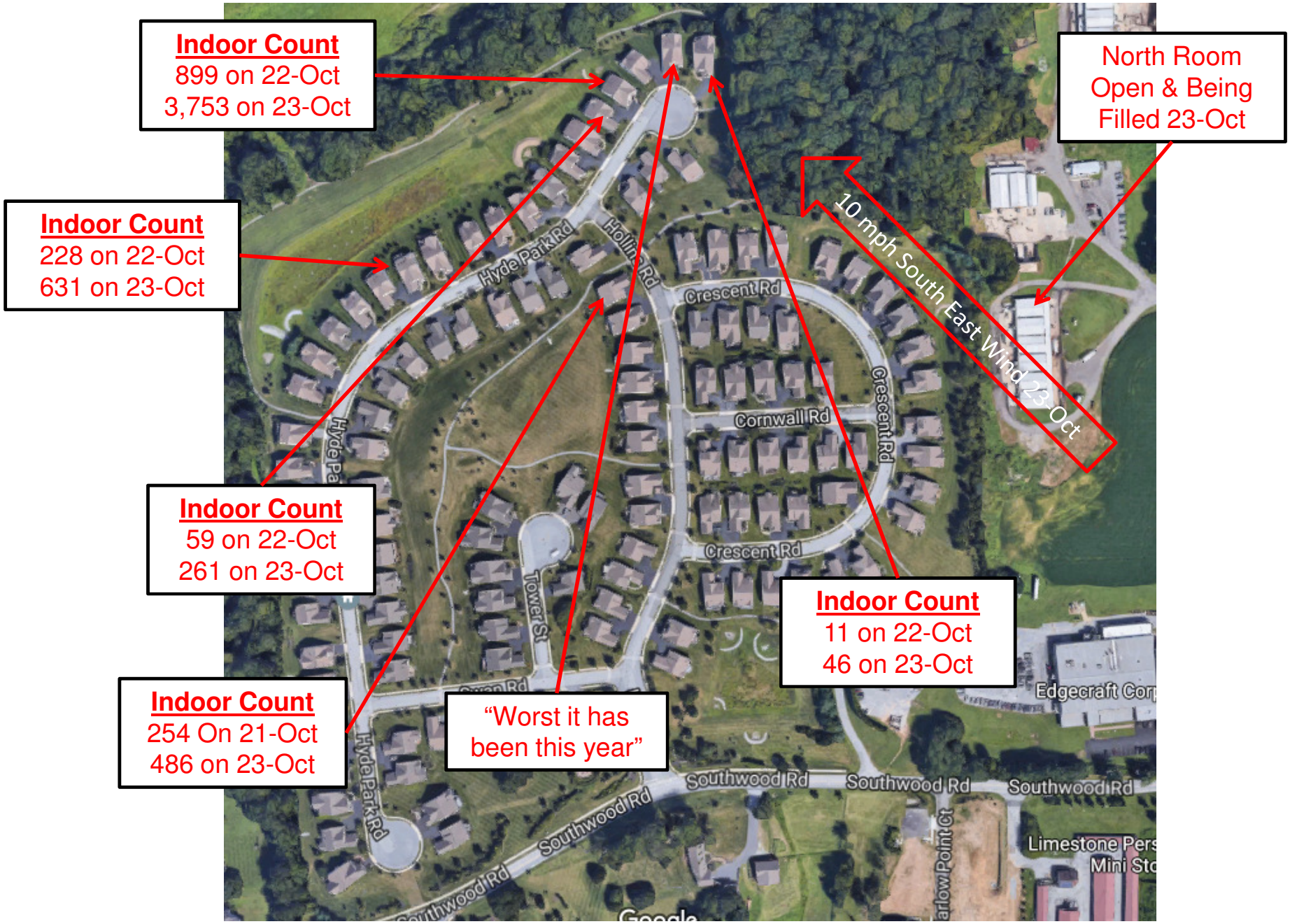
Indoor Count
53 on 11-Oct
350 on 13-Oct

Outdoor Sample
53 on 10/10
386 on 10/13

Outdoor Sample
518 on 10/12
1650 on 10/13

Indoor Count
376 On 11-Oct
1600 on 14-Oct

Phorid Fly "Attack" October 23, 2017

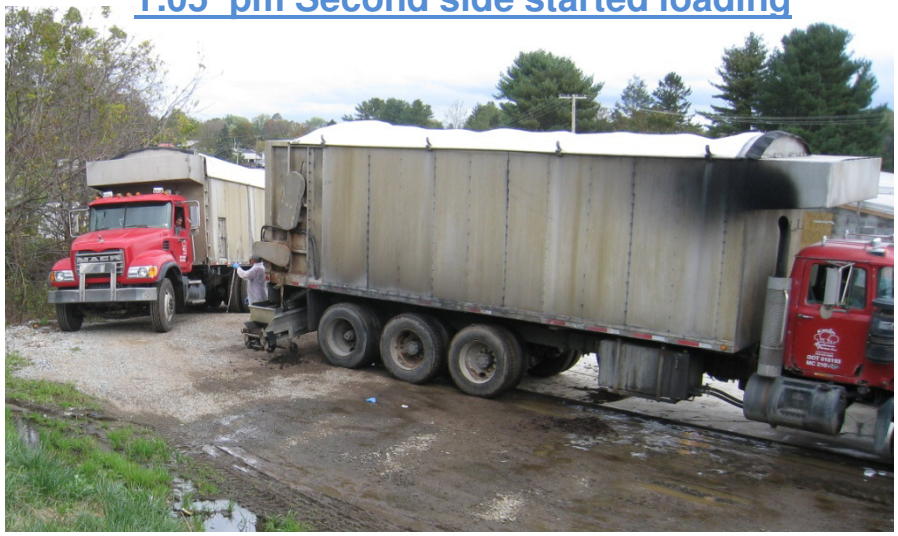


Mushroom Farm Activities During Phorid Fly "Attack" October 23, 2017

10:15 am Door Open

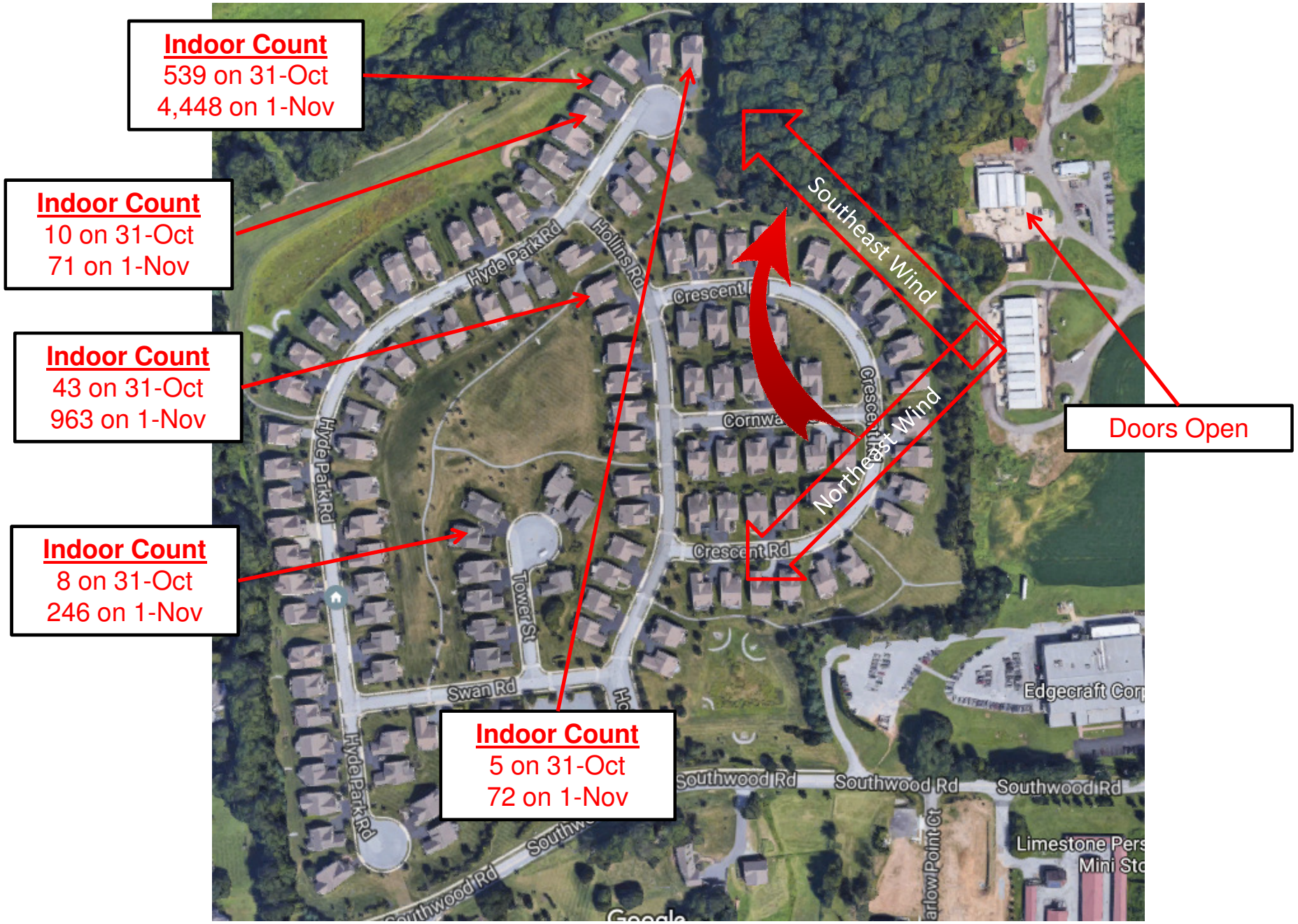
1:00 pm One side loaded second side ready

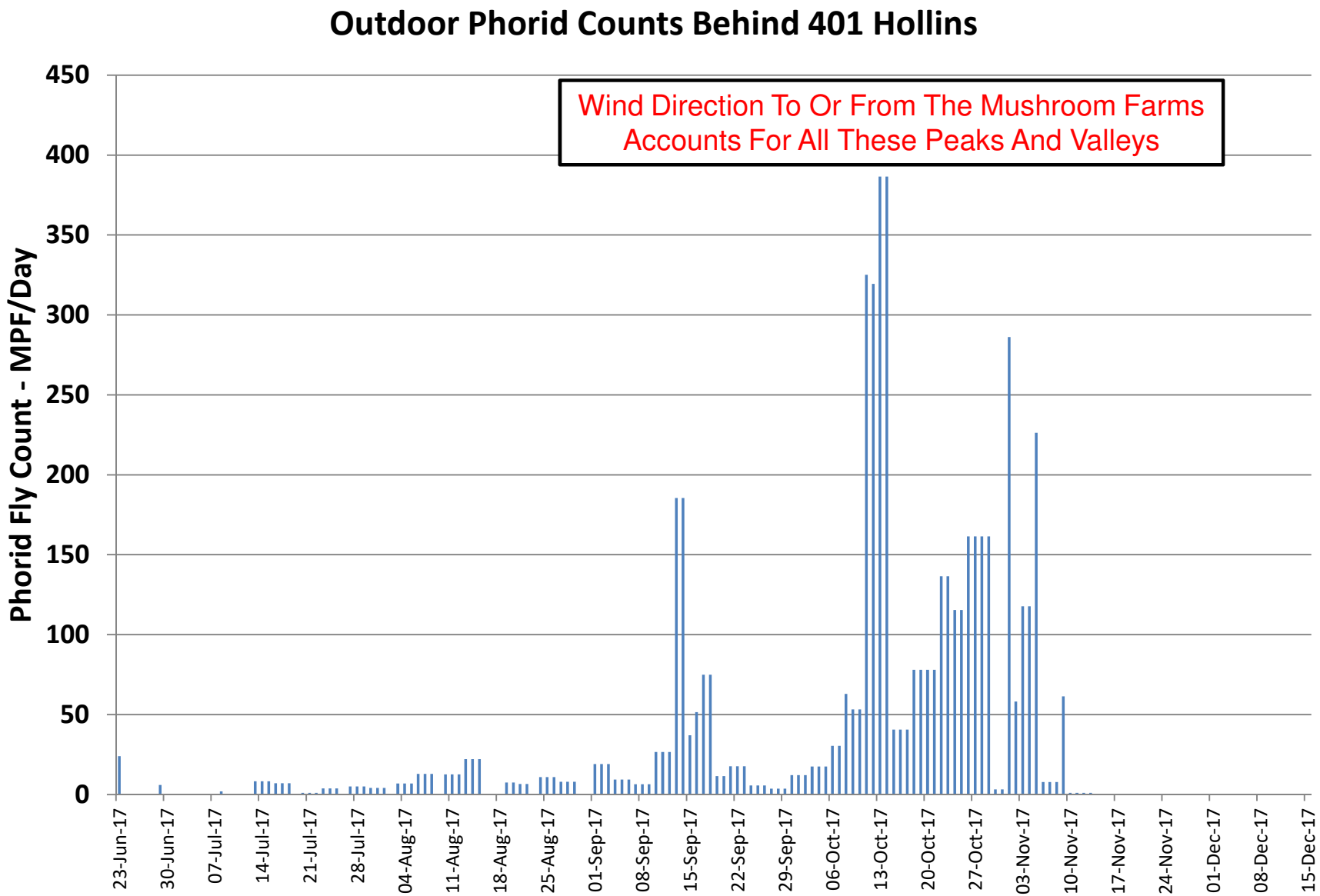
1:05 pm Second side started loading



Next Day at 10:45 am operation complete

Phorid Fly "Attack" November 1, 2017




Outdoor Phorid Counts Behind 401 Hollins
Wind Direction To Or From The Mushroom Farms
Accounts For All These Peaks And Valleys
Phorid Fly Count - MPF/Day
450
400
350
300
250
200
150
100
50
0
23-Jun-17
30-Jun-17
07-Jul-17
14-Jul-17
21-Jul-17
28-Jul-17
04-Aug-17
11-Aug-17
18-Aug-17
25-Aug-17
01-Sep-17
08-Sep-17
15-Sep-17
22-Sep-17
29-Sep-17
06-Oct-17
13-Oct-17
20-Oct-17
27-Oct-17
03-Nov-17
10-Nov-17
17-Nov-17
24-Nov-17
01-Dec-17
08-Dec-17
15-Dec-17

The Source of the Phorid Flies

It is the mushroom farms

Conclusions

1. The fly population builds spring to fall
2. Wide variability in how homes are affected
3. The flies are coming from the mushroom farms
4. Insecticides or repellents may help but do not eliminate the problem
5. Two logical points of control
    A. At the source – a political issue
    B. Where they are entering our homes – if we knew where

Penn State Phorid Fly Management Research Strategies

- **Use of biological pesticides to kill fly larvae in the mushroom soil.**
- **Use of eaves tubes to stop adult fly movement between adjacent rooms.**
- **Collect adult flies using mushroom house air circulation system.**
- **Attract adult flies using sex pheromones.**

Going Forward

1. **Spray test follow up – residents of control homes will be contacted as to their wishes to have their homes sprayed**

2. **No means have been found at this time of completely eliminating the problem, just suppressing it.**

    - **Asking neighbors to share remedies they are using within their homes**

3. **No insecticides, repellents or anything else should be applied to the bio-basins or other common areas in the community.**

4. **The Board will define a policy regarding what can be sprayed and where it can be sprayed to manage Phorid Flies.**

5. **The Board will be scheduling a meeting with NGT representatives to present the findings of the Vetting Team.**