INTEGRATED PHYTOPHTORA MANAGEMENT WITH BIOFUMIGATION & REDUCED TILLAGE: POST-PROJECT SURVEY

1) GENERAL PHYTOPHTHORA BLIGHT (PB) AND/OR SOIL-BORNE DISEASE MANAGEMENT QUESTIONS:

Is Phytophthora blight the most damaging soil-borne disease you have on your farm? **YES** ☒ **NO**☐

If YES,
how often in YEARS7, on how many ACRES2,with $2,500EST. LOST IN CROP VALUE/YR

Are thereother soil borne diseases that significantly impact your crops? **YES** ☐ **NO**☒

If **YES**, which diseases, on which crops?

If **YES**,
How often in YEARS , on how many ACRES , with $ EST. LOST IN CROP VALUE/YR

To manage Phytophthora blight and/or soil borne diseases on my farm, I use (check all that apply):
☒Resistant cultivars/varieties
1) ☐Fungicide programs
   - ☐Chemical soil fumigation
   - ☐Soil-applied and/or chemigated fungicides
   - ☐Foliar fungicides
   - ☐Beneficial organisms/biofungicides
2) ☒Sanitation measures (washing equipment, safe disposal of infected crop residue, pure irrigation water, etc.)
3) ☒Culling out infected plants
4) ☐Avoiding areas with poor drainage/very high water tables
5) ☐Planting in areas where I expect good water infiltration after heavy rainfall
6) ☐Raised beds and/or plasticulture
7) ☒Mulches
   - ☒Straw
   - ☐Living mulches
   - ☐Rolled cover crops
   - ☐Previous crop's stubble/residue
8) ☒Drip irrigation
9) ☒Subsoiling
10) ☒Rotations away from susceptible crops
   - ☐1-2 years away
   - ☒3+ years away
11) ☐Weed control measures that target weedy hosts of problem soil borne diseases
12) ☐Deep tillage for burying infected crop residues after year with widespread infection
13) ☒General cover cropping for soil health
14) ☒Biofumigation with brassica cover crops
15) ☐Reduced tillage
16) Other:
In 2017 we started staking our peppers to keep the fruits from contacting soil.

I am interested most in development of which of the above strategies for managing PB and/or other soil borne diseases:
resistant varieties

If you have *not* used *biofumigation* and/or *reduced tillage* to manage Phytophthora blight and/or other soil borne diseases, *skip to question 3b*.

2) BIOFUMIGATION QUESTIONS:

Were you using biofumigation practices before this project began (Fall 2014)? **YES** ☐ **NO**☒

If YES, for how many years(*post*-2014), before which crops, and on how many acres (average)?

YEARS, with CROPS on ACRES

If NO, for how many years(*post*-2014), in which crops, and on how many acres(average)?

2 YEARS, with 2 CROPS on.1ACRES

I chose a brassica cover crop species/varietybred specifically for biofumigation purposes.**YES** ☒ **NO**☐

If **YES**, which species/variety?

'Caliente' mustard ☒,**'Pacific Gold' mustard**☐,**'Ida Gold' mustard** ☐, **'Nemat' arugula**☐, **'Kodiak' mustard** ☐
Other:

If **NO**, which species and variety of brassica cover crop did you choose?

Why did you choose a species/variety not specifically bred for biofumigation?

Did you do a*spring* or *fall*-sown brassica cover crop? **Fall**☒ **Spring** ☐

Why?
We obtained the seed in the fall.

Your most recent biofumigation management information (approximate):

- Acres biofumigated:.15
- Seeding date:8/7/15
- Seeding rate (lbs./ac):~10
- Fertilizer and rate (ex: Urea 46-0-0, 150 lbs./ac):?
- Biofumigation cover crop termination date, crop stage/days after planting: 9/16/15
- Termination (ex: flail, rotary mow, rototill, spray): rototill
- Incorporation method (ex: rototill, disk, etc.): rototill
- Soil surface sealing method (ex: none, cultipack, roll, etc.): none
- Irrigated after incorporation?(YES or NO): no
- Following cash crop: peppers, cucumbers
- Cash crop planting date: May 2016

I learned about biofumigation practices for Phytophthora blight management from:
Justin

2) REDUCED TILLAGE QUESTIONS:

Were you using reduced tillage before this project began (Fall 2014)? **YES** ☐ **NO**☒

If YES, on how many acres and for how many years (average)?

ACRES, for YEARS

Did you use reduced tillagepart of a PB and/or other soil borne disease management program before this project began (Fall 2014)? **YES** ☐ **NO**☒

If YES, for how many years, in which crops, and on how many acres?

YEARS, with CROPS on ACRES

If NO, for how many years, in which crops, and on how many acres?

YEARS, with CROPS on ACRES

What type of reduced tillage do you use (ex: zone-till, no-till, ridge till etc.)

Do you plant cash crops into rolled/mowed/hayed/living mulch etc. cover crops? **YES** ☐ **NO**☒

If YES, which cover crops, and which method (rolled, mowed, hayed, and/or living mulch, etc.)?

3a) BENEFITS AND BARRIERS QUESTIONS(RE: BIOFUMIGATION AND/OR REDUCED TILLAGE):

Regarding *biofumigation*, I observed these potential *barriers* to adoption:
the need to be so precise on date and method of incorporation in order for it to be effective

Regarding *biofumigation*, I observed these potential *benefits* to adoption:
we have had less and less problems with PB each year, which may be partially due to biofumigation

Regarding *reduced tillage*, I observed these potential *barriers* to adoption:

Regarding *reduced tillage*: I observed these potential *benefits* to adoption:

3b) BENEFITS AND BARRIERS QUESTIONS (RE: GENERAL INTEGRATED MANAGEMENT):
Regarding *overall, integrated management* of PB and/or other soil borne diseases, I have observed these potential *barriers* to adoption:

Regarding *overall, integrated management*of PB and/or other soil borne diseases, I have observed these potential *benefits* to adoption:

4b) PROJECT SUCCESS QUESTIONS (RE: GENERAL INTEGRATED MANAGEMENT):

On a scale of one to ten (where 1= never again, 5=likely but waiting for more information, 6=on a small scale but waiting for more information before scaling up, 10=absolutely), rate:

I will use *an integrated approach*for managing PB and/or other soil borne diseases in the future:
1☐2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐ 10☒

I would recommend an integrated approach for managing PB and/or other soil borne diseases to another grower:
1☐2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐ 10☒

How many area growers approached you to learn about integrated practices for managing PB and/or other soil borne diseases?
0

Approximately how many of your peer growers told you that they were going to try, or had already begun integrating multiple practices for managing PB and/or other soil borne diseases?
0

What do you estimate that an integrated PB and/or other soil borne diseasemanagement strategy *saved* you in crop value?

unsure$ per acre of CROPS on ACRES

I estimate that the investment into an integrated management strategy was worth it even after the first year of adoption**. YES** ☐ **NO**☐

Other comments on managing PB and/or other soil borne diseases:

I estimate that the investment into integrated management will pay off in the longer-term.**YES** ☒ **NO**☐

Comments:

On a scale of one to ten, I would rate that this projecthelped me learn how to successfully integrate strategies for managing PB and/or other soil borne diseases (where 1=it didn't help at all, 10=it was immensely helpful):
1☐2☐ 3☐ 4☐ 5☐ 6☒ 7☐ 8☐ 9☐ 10☐

If you have *<u>not</u>* used *biofumigation* and/or *reduced tillage* to manage Phytophthora blight and/or other soil borne diseases *the survey ends here*.

4b) <u>PROJECT SUCCESS QUESTIONS (RE: BIOFUMIGATION AND/OR REDUCED TILLAGE):</u>

On a scale of one to ten (where 1= never again, 5=likely but waiting for more information, 6=on a small scale but waiting for more information before scaling up, 10=absolutely), rate:

I would use biofumigation for managing PB and/or other soil borne diseasesagain:
1☐2☐ 3☐ 4☐ 5☐ 6☒ 7☐ 8☐ 9☐ 10☐

I would recommend biofumigation for managing PB and/or other soil borne disease to another grower:
1☐2☐ 3☐ 4☐ 5☐ 6☐ 7☒ 8☐ 9☐ 10☐

I would use reduced tillage again for managing PB and/or other soil borne diseases:
1☐2☒ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐ 10☐

I would recommend reduced tillage for PB and/or other soil borne disease management to another grower:
1☐2☒ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐ 10☐

I would integrate biofumigation and reduced tillage again for managing PB and/or other soil borne diseases:
1☐2☐ 3☐ 4☐ 5☐ 6☐ 7☒ 8☐ 9☐ 10☐

I would recommend integrated biofumigation and/or reduced tillage for managing PB and/or other soil borne diseases to another grower:
1☐2☐ 3☐ 4☐ 5☐ 6☐ 7☒ 8☐ 9☐ 10☐

Of the above questions *you rated* *6 or above on*, on how many acres?
2

Approximately how many of other growers approached you to learn about biofumigation and/or reduced tillage practices for managing PB and/or other soil borne diseases?
0

Approximately how many other growers told you that they were going to try, or had already begun integrating biofumigation and/or reduced tillage practices for managing PB and/or other soil borne diseases?
1

What do you estimate that an integrated for PB and/or other soil borne disease management strategy that *includes biofumigation and/or reduced tillage* saved you in crop value?

unsure$ per acre of CROPS on ACRES

I estimate that the investment into biofumigation and/or reduced tillage was worth it *even after the first year of adoption*. **YES** ☐ **NO**☐

Comments:

I estimate that the investment into biofumigation and/or reduced tillage will pay off in *the longer-term*.
YES ☐ **NO**☐

Comments:

On a scale of one to ten,I would rate that this project helped me learn how to successfully biofumigate and use reduce tillage for Phytophthtora blight and/or other soil borne disease management (where 1=it didn't help at all, 10=it was immensely helpful):

1☐2☐ 3☐ 4☐ 5☐ 6☐ 7☒ 8☐ 9☐ 10☐

THANK YOU!

Please hit **save,** and return to justin.odea@wsu.edu.

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or send a clear picture of each page to the above email or text to 845-943-9808.