Tables and Figures

Table 11. Solarization and brassicaceous seed meal trial at WSU-Mount Vernon (WA) in 2008-2009.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Treatment and rate/A | *P. rubi* root rot ratingz |  |  | *#* of *P. penetrans/50 g soil* |
| Root weight (g) | Aerial weight (g) | Jul 08 | Jan 09  | Apr 09 |
| Control……………………. |  4.9 cx | 3.2 | 3.1 ab | 14.6 |  2.4 bc | 2.4  |
| Solarization...…………….. |  5.3 bc | 3.0 | 3.0 ab | 16.8 | 24.4 a | 2.4 |
| InLine™ 35……………….. | 6.2 a | 2.5 | 2.1 c |  9.0  |  0 c | 0  |
| *S. alba* (1% w/v) ………….. | 4.6 c | 3.1 | 3.3 a |  9.6 |  7.2 bc | 2.4 |
| Solarization + InLine… …… | 6.1 a | 2.9 | 2.6 bc | 12.8 |  1.2 c | 0  |
| Solarization + *S. alba*………. |  5.7 ab | 2.9 | 2.7 b |  7.4 |  7.2 bc | 4.8 |
| Solarization + linseed meal (1%w/v)  |  5.7 ab | 3.1 | 2.7 b | 19.4 | 14.6 ab | 8.8 |
| LSD(*P* < 0.05)……………… | *0.71* | *NSD* | *0.5* | *NSD* | *12.36* | *NSD* |

1 P-values less than or equal to 0.05 is significant.

*2* Means followed by the same letter within a column are not significantly different as determined by Fisher’s protected least significant difference. *NSD*=No significant difference.

3Averaged over three bioassay plants per plot.

4Averaged over four bioassay plants per plot.

Table 12. Soil properties of brassicaceous seed meal field trial at WSU-Mount Vernon (WA) 2009-2010.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Treatment** | **%OM**  | **NH4-N****(ppm)** | **N03-N (ppm)** | **S****(ppm)** | **pH** |
| Control. | 4.5 | 4.8 b | 46.8 c | 12.4 d | 5.7 a |
| Solarization | 4.3 | 4.2 b | 58.6 c | 12 d | 5.5 ab |
| *B.juncea* (1% v/v) | 4.3 | 4.6 b | 29.6 c | 19 cd | 5.6 a |
| *S. alba* (1% v/v)  | 4.8 | 6.4 b | 43.2 c | 30.1 cb | 5.2 cb |
| Solarization + *B.juncea* | 4.2 | 15.8 a | 103 b | 34.2 b | 5.2 c |
| Solarization + *S. alba* | 4.4 | 16.2 a | 116 b | 50 a | 5.2 c |
| Solarization + linseed meal(1%v/v)  | 4.5 | 8.8 b | 153.6 a | 17.8 c | 5.1 c |
| LSD (P<0.05) | *NSD1* | *5.6* | *29.2* | *14.5* | *0.27* |

1 P-values less than or equal to 0.05 is significant.

*2* Means followed by the same letter within a column are not significantly different as determined by Fisher’s protected least significant difference.*NSD*=No significant difference.

3Soil samples (2.5 cm diam., 15 cm deep) were collected in March 2010 and analyzed at A&L Laboratories West, Portland, OR.

Table 13. Response of nematode community to seed meal applications in two different grower fields soils in a microplot field study.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Total Number | *P. penetrans* | BI3 | SI | EI | CI | Bacterial(prop) | Fungal(prop) | Omn/Pred (prop) | Plant(prop) |
| **Pretreatment** |  |  |  |  |  |  |  |  |  |  |
| Soil A1 | 1245 a | 277.2 a | 25.4 | 51.1 | 65.1 | 6.9 | 0.56 | 0.05 | 0.12 | 0.26 |
| Soil B2 | 315.5 b | 32.2 b | 29.1 | 44.5 | 62.1 | 8.4 | 0.60 | 0.07 | 0.10 | 0.22 |
| *LSD (P<0.05)* | *373.7* | *128.1* | -- | -- | -- | -- | -- | -- | -- | -- |
| **1 week** |  |  |  |  |  |  |  |  |  |  |
| Soil A | 409.8 a | 81.2 a | 24.9 | 54.9 | 31.3 | 7.2 a | 0.66 a | 0.06 a | 0.14 | 0.20 |
| Soil A + *B. juncea* | 3.5 b | 0.75 b | 26.9 | 0 | 48.2 | 0 b | 0 b | 0 b | 0 | 0.25 |
| Soil A+ *S. alba* | 77.8 b | 21.2 b | 0 | 25 | 0 | 0 b | 0.33 ab | 0 b | 0.25 | 0.18 |
| *LSD* | *136.1* | *47.8* | *--* | *--* | *--* | *5.2* | *0.4* | *0.05* | *--* | *--* |
|  |  |  |  |  |  |  |  |  |  |  |
| Soil B | 385.8 a | 121.2 a | 30.1 | 18.9 | 66.6 | 6.6 | 0.60 | 0.07 | 0.04 | 0.34 |
| Soil B + *B. juncea* | 2 b | 15.1 b | 8.3 | 0 | 16.7 | 0 | 0.19 | 0 | 0 | 0.06 |
| Soil B + *S. alba* | 60.5 b | 0.5 b | 48.5 | 0 | 26.5 | 26.5 | 0.50 | 0.09 | 0 | 0.26 |
| *LSD* | *68.5* | *57.3* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* |
| **5 week** |  |  |  |  |  |  |  |  |  |  |
| Soil A | 389.3 | 52.4 | 27.5 | 52.7 a | 51.9 | 3.4 | 0.67 | 0.03 | 0.17 a | 0.14 a |
| Soil A + *B.junceae* | 570.3 | 4.8 | 17.9 | 2.9 b | 81.9 | 5.1 | 0.89 | 0.10 | 0.004 b | 0.02 b |
| Soil A+ *S.alba* | 1820.0 | 31.5 | 19.2 | 40.6 a | 77.5 | 15.8 | 0.65 | .024 | 0.09 ab | 0.02 b |
| *LSD* | *--* | *--* | *--* | *31.0* | *--* | *--* | *--* | *--* | *0.12* | *0.08* |
|  |  |  |  |  |  |  |  |  |  |  |
| Soil B | 470.3  | 83.2 | 41.5 a | 44.0 a | 36.0 b | 29.2 | 0.60 c | 0.03 | 0.12 a | 0.26 |
| Soil B + *B. juncea* | 1769.8 | 0 | 10.9 b | 5.9 b | 88.6 a | 0.2 | 0.98 a | 0.007 | 0.01 b | 0 |
| Soil B + *S. alba* | 2335 | 47.7 | 16.5 b | 32.0 a | 81.9 a | 3.3 | 0.84 b | 0.08 | 0.05 ab | 0.03 |
| *LSD* | *--* | *--* | *16.1* | *21.5* | *25.4* | *--* | *0.04* | *--* | *0.07* | *0.09* |

1 Skagit County (Briscot fine sandy loam) collected in June 2010.

2 Whatcom County (Kickerville silt loam) collected in June 2010.

3 Ferris and Bongers, 2001.

4Means followed by the same letter within a column are not significantly different as determined by Fisher’s protected least significant difference.*NSD*=No significant difference.

Table 14. Results of plant back experiment using *B. junceae* and *S.alba* over time.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *B. juncea* | *S.alba* | CT  | *LSD (P<0.05)* |
| **1 week** |  |  |  |  |
| % Plant Damage TC2 | 0 b | 48.3 a | 0 b | *7.8* |
| No. germinated seeds-radish3 | 20 | 20 | 20 | *NSD5* |
| No. germinated seed-lettuce4 | 18 | 15 | 16 | *NSD* |
|  |  |  |  |  |
| **4 week** |  |  |  |  |
| % Plant Damage TC | 0 | 0 | 0 | *NSD* |
| No. germinated seeds-radish | 20 | 20 | 20 | *NSD* |
| No. germinated seed-lettuce | 16 | 13 | 12 | *NSD* |
|  |  |  |  |  |
| **6 week** |  |  |  |  |
| % Plant Damage TC | 0 | 0 | 0 | *NSD* |
| No. germinated seeds-radish | 3 | 7 | 3 | *NSD* |
| No. germinated seed-lettuce | 17 | 17 | 13 | *NSD* |

1Data from Test 1 and Test 2 are combined

2Tissue culture raspberry plant ‘Meeker’

3’Cherry Belle’ from Burbee Seed Co. (seed lot 3)

4’Black Simpson’ from Burbee Seed Co. (seed lot 8)

5 Means followed by the same letter within a row are not significantly different as determined by Fisher’s protected least significant difference. *NSD*=No significant difference.

Figure 10. Quantitative real-time molecular assay for *Phytophthora rubi* for the Lynden, WA field trial.



Figure 11. *Phytophthora rubi* inoculum evaluation bioassay for root rot (0-9 scale) from brassicaceous seed meal field trial 2009-2010. Columns identified by the same letter are not significantly (P<0.05) different according to least significant difference.





Figure 12. Results root rot and root and aerial weight for seed meal rate greenhouse trial for *P.rubi.*

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Figure 13. Results nematode number (A) and root and aerial weight (B) for seed meal rate greenhouse trial for *P.penetrans*.



