

Evaluation of the fumigants Pic-C60 and Pic Plus for control of clubroot and black rot of cabbage grown in Wisconsin, 2011.

A fumigation trial to evaluate the performance of Pic-C60 and Pic Plus to control clubroot and black rot of cabbage was conducted on a commercial cabbage farm in Shiocton, Wisconsin during the summer of 2011. Research plots were 200 ft long and consisted of 4 rows of cabbage spaced 36-in apart. Nine treatments were replicated 4 times in a randomized complete block design. Fumigation treatments were broadcast applied on 15 October 2010 and the plots were transplanted to cabbage on 25 May 2011. Transplants were 3-weeks-old at time of transplanting. Both black rot and club root diseases developed naturally and the plots were hand-harvested on 29 August 2011. Ten head of cabbage were randomly selected from each plot at harvest, and the weight, and the severity of club root and black rot were measured for each head. Clubroot was evaluated by pulling entire plants up out of the ground and rating root systems on a scale of 0-10 (0=no misshapen roots from clubroot, 1=<10%, 2=10-20%, 3=20-30%, 4=30-40%, 5=40-50%, 6=50-60%, 7=60-70%, 8=70-80%, 9=80-90%, 10=100%). Black rot was evaluated with a rating scale of 0-3 (0=no black rot, 1=<30% of outer or wrapper leaves exhibiting V-shaped yellowing, 2=>30% of outer or wrapper leaves exhibiting V-shaped yellowing or necrosis, 3=necrosis of outer wrapper & head leaves).

Precipitation for Shiocton during the duration of the cabbage trial was 3.96 in with no supplemental irrigation being applied to the trial. Black rot disease pressure was low in this trial. Clubroot disease pressure was moderate with the unfumigated control resulting in roughly 50% misshapen, clubbed roots. All fumigation treatments were significantly better than the unfumigated control at limiting clubroot. The two higher rate treatments of Pic-C60 (250 and 333 lb/acre) had no clubroot at all. All treatments, except for Pic-C60 167 lb, Pic Plus 234 lb, and Pic Plus 468 lb, had significantly less black rot than the unfumigated control. Overall, the weight of individual heads of cabbage were low in this trial compared to industry standard due to our intentional planting of this field to cabbage two years in a row in order to promote cabbage diseases for enhanced evaluation of treatments. All fumigation treatments produced significantly heavier cabbage heads than the unfumigated control.

Treatment and rate of active ingredient/acre	Mean clubroot severity (0-10 rating)	Mean black rot severity (0-3 rating)	Mean head weight (lb)
1.Unfumigated control.....	4.53 c	0.49 c	2.49 a
2.Pic-C60 83 lb.....	0.10 a*	0.17 ab	6.64 e
3.Pic-C60 167 lb.....	0.17 ab	0.43 bc	6.47 de
4.Pic-C60 250 lb.....	0.00 a	0.23 ab	5.89 cde
5.Pic-C60 333 lb.....	0.00 a	0.13 a	6.02 cde
6.Pic Plus 117 lb.....	0.40 ab	0.16 a	5.79 cd
7.Pic Plus 234 lb.....	0.35 ab	0.29 abc	5.41 bc
8.Pic Plus 351 lb.....	0.61 b	0.29 ab	5.07 b
9.Pic Plus 468 lb.....	0.20 ab	0.34 abc	6.04 cde

*Column numbers followed by the same letter are not significantly different at P=0.05 as determined by Fisher's Least Significant Difference test.