

BIBLIOGRAPHY

MICLAT, REYJONES P. APRIL 2012. Preliminary Study on the Management of Carrot Powdery Mildew (*Oidium* sp.) Using Organic Foliar Fertilizer. Benguet State University, La Trinidad, Benguet.

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ABSTRACT

This preliminary study was conducted at the Department of Plant Pathology to determine the effects of a specific foliar fertilizer on the growth and yield of carrots as well as in controlling powdery mildew infection. Specifically, it aimed to determine the effects of the foliar fertilizer on disease severity, plant growth and yield quality.

Results showed that the foliar fertilizer has not influenced the growth of carrots. In the occurrence of powdery mildew, application of the foliar fertilizer compared to the negative control, Virtuoso, and Mokusaku, the foliar fertilizer rates were insignificant in terms of percentage efficacy in controlling powdery mildew.

Results imply that while the foliar fertilizer did not effectively control powdery mildew, the highest rate improved root yield weight and root orange color intensity.



RESULTS AND DISCUSSION

Plant Height and Number of Leaves per Plant

The treatments were not significant in terms of plant height and number of leaves per plant (Table 1). This indicates that all the treatments have the same effect on the height and number of leaves of the plants. D.I Grow and Mokusaku showed the same effect with the other treatment since these provide nutrients as well as protection to the plants. Virtuoso was also the same with the other treatments since it protects the host against the fungus, thereby favoring the growth of the plants. The negative control was also the same with the other treatments since it lacks nutrients for the growth and development of the fungus thereby giving less infection and which allows the plant to grow.

Table 1. Mean plant height (cm) and number of leaves in response to the foliar treatment dosages

TREATMENTS	MEAN	
	Plant Height	No. of Leaves
T ₀₁ =Negative Control	27.0000 ^a	7.3330 ^a
T ₀₂ =Virtuoso	33.2667 ^a	8.6667 ^a
T ₀₃ =Mokusaku	30.1667 ^a	8.3330 ^a
T ₁ =50ml D.I Grow	29.0000 ^a	7.3330 ^a
T ₂ =80ml D.I Grow	24.6000 ^a	9.0000 ^a
T ₃ =150ml D.I Grow	33.1000 ^a	9.3330 ^a

Means with a common letter are not significantly different at 5% level using DMRT



Percentage Efficacy of Foliar Treatments

As compared to the negative control. Results showed that D.I Grow is not significant with the negative control. This implies that the effect of D.I Grow and the negative control to control powdery mildew is similar. Since the negative control lacks nutrients for the fungus, the pathogen population was observed least in this treatment. On the other hand, D.I Grow did not control powdery mildew infection.

As compared to Virtuoso. Results showed that D.I Grow is not significant with Virtuoso. This implies that the effect of D.I Grow and Virtuoso to control powdery mildew of carrots is the same. Virtuoso as a biological fungicide protects the plant against powdery mildew which would allow the host to grow. On the other hand, D.I Grow provides nutrients for the plants to grow.

As compared to Mokusaku. Results showed that D.I Grow is not significant with Mokusaku. This implies that the effect of D.I Grow and Mokusaku to control powdery mildew of carrots is the same. Mokusaku has elements that control powdery mildew of carrots, which in this case was present in minimal amount. D.I Grow, on the other hand, has seaweed extract component that controls powdery mildew infection.

Table 2. Mean percentage efficacy of foliar treatments

TREATMENTS	MEAN		
	Negative Control	Virtuoso	Mokusaku
T ₁ =50ml D.I Grow	33.33 ^a	14.33 ^a	6.37 ^a
T ₂ =80ml D.I Grow	26.67 ^a	8.53 ^a	4.67 ^a
T ₃ =150ml D.I Grow	36.67 ^a	7.67 ^a	2.67 ^a

Means with a common letter are not significantly different at 5% level using DMRT



Disease Severity

Final disease severity. Mokusaku and D.I Grow at 80 ml and 150 ml have shown not significantly different final disease severity rating (Table 3). Since these treatments supplement nutrients to host, availability of nutrients for the invading pathogen is expected. The pathogen population was observed high on these treatments.

Except for the negative control as attributed to the nutrient competition, all the treatments have capability of controlling the fungus. Data gathered shows the efficacy of Virtuoso and Mokusaku was not significantly different with D.I Grow (Table 2). In contrast, Virtuoso serves as biological fungicide to control the disease but does not provide nutrients to the host. On the other hand, D.I Grow and Mokusaku control the disease in relative less affectivity considering that these contain the controlling elements in minimal amounts, and as well as provide nutrients to the plant.

Mean disease severity. Mean disease severity is shown in Table 3. Negative control showed the lowest mean which implies that it has lesser infection as compared with the other treatments. Since water was the only input used, the host lacks nutrients to support the invading pathogen. In addition, pathogen population (through the appearance of white patches) was observed descending as the plants matured.

Fresh Weight and Orange Color Intensity of Roots

D.I Grow at 150ml/16l dosage has the highest fresh weight (Table 4), and attained the most dark orange root color (Table 5 and Figure 3) as compared with the other dosage and treatments. This implies that applying D.I Grow at 150ml will increase profit since it has the characteristics which are preferred by market buyers.



Table 3. Mean disease severity

TREATMENTS	MEAN	
	Final Percentage	Average Percentage
T ₀₁ =Negative Control	11.0000 ^c	15.3330 ^c
T ₀₂ =Virtuoso	23.3300 ^{bc}	23.3330 ^{ab}
T ₀₃ =Mokusaku	38.3300 ^{ab}	27.3330 ^{ab}
T ₁ =50ml D.I Grow	52.0000 ^a	42.6667 ^a
T ₂ =80ml D.I Grow	40.0000 ^{ab}	36.6667 ^{ab}
T ₃ =150ml D.I Grow	43.0000 ^{ab}	36.6667 ^a

Means with a common letter are not significantly different at 5% level using DMRT

Table 4. Mean fresh weight of roots

TREATMENTS	MEAN
T ₀₁ =Negative Control	22.13 ^{ab}
T ₀₂ =Virtuoso	23.67 ^{ab}
T ₀₃ =Mokusaku	19.17 ^{bc}
T ₁ =50ml D.I Grow	16.57 ^c
T ₂ =80ml D.I Grow	15.67 ^c
T ₃ =150ml D.I Grow	26.77 ^a

Means with a common letter are not significantly different at 5% level using DMRT



Table 5. Root color intensity

TREATMENTS	COLOR
T ₀₁ =Negative Control	most light orange root
T ₀₂ =Virtuoso	more light orange root
T ₀₃ =Mokusaku	more dark orange root
T ₁ =50ml D.I Grow	light orange root
T ₂ =80ml D.I Grow	dark orange root
T ₃ =150ml D.I Grow	most dark orange root



Figure 3. Orange root color intensity

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study was conducted at the Department of Plant Pathology Greenhouse from November 2011 to March 2012 to determine the effect of a specific foliar fertilizer on the growth and yield of carrots as well as in controlling powdery mildew infection. It aimed to determine the effect of the foliar fertilizer on disease severity, plant growth and yield quality.

Results showed that carrots sprayed with 150ml/16l D.I Grow had darker orange color of roots as compared to the carrots which are sprayed with 50 ml/16l and the recommended rate at 80ml/16l. Plants sprayed with D.I Grow showed high disease infection but the increased rate (150 ml/16l) had better result in terms of root weight and quality. In terms of disease severity, negative control had the lowest mean but produced poor quality and lightest orange root color. Virtuoso, Mokusaku and the negative control are not significant to D.I Grow in terms of their efficacy to control powdery mildew of carrots.

Significant findings of the study includes: foliar fertilization did not improve plant heights and number of leaves that emerged, the efficacy of foliar fertilizer in controlling powdery mildew did not differ from Virtuoso, Mokusaku and the negative control, foliar fertilizer did not differ from Virtuoso and Mokusaku in terms of disease severity. The negative control had less severity due to lack of nutrients for pathogen development, and the foliar fertilizer at 150 ml/16l had the heaviest fresh weight and darkest orange root color.



Conclusion

The foliar fertilizer alone could not control powdery mildew of carrots but it improves root fresh weight and orange color intensity when used at 150ml/16l.

Recommendation

Further study is recommended to be conducted under field condition to evaluate the effect of D.I Grow on the severity of powdery mildew and yield of carrots. The study would rather be designed to combine Virtuoso or Mokusaku with the foliar fertilizer treatments. Virtuoso and Mokusaku are recommended to be combined with the foliar fertilizer treatment in order for the plant to have protection against carrot powdery mildew. On the other hand, D.I Grow will provide the nutrients needed by the plant for growth.



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