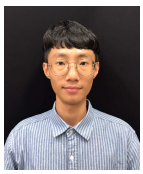
Use of Vibration Stimulation for Growth Inhibition of Tomato Plug Seedlings



Hyeon Min Kim[1], Hye Min Kim[1], Hye Ri Lee[2], and Seung Jae Hwang[1,2,3*]

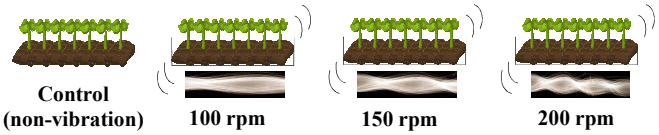
[1]Department of Horticulture, Division of Applied Life Science, Graduate School of Gyeongsang National University, Jinju 52828, Korea;
[2]Department of Horticulture, College of Agriculture & Life Sciences, Gyeongsang National University, Jinju 52828, Korea;
[3]Institute of Agriculture & Life Sciences, Gyeongsang National University, Jinju 52828, Korea

Research objective

- To investigate the effect of growth regulation for growth inhibition of tomato seedlings as affected by different vibration speeds as physical stimulations of environment-friendly method.

Materials & Methods

- Plant material : Tomato (*Solanum lycopersicum* L. 'B-blocking')
- Place : Venlo-type greenhouse at Gyeongsang National University
- Sowing date : Feb. 11, 2017
- Cultivation environment : 17 – 25℃ & RH 50 ± 10%
- Nutrient solution : pH 6.5 & EC 1.5 dS·m^{-1}
- Vibration speed : 0 (control), 100, 150 or 200 rpm for 120 seconds per day
- Parameters : Leaf length & width, root length, stem diameter, leaf area, dwarf rate, plant height, internode length, T/R ratio, compactness, fresh & dry weights of shoot or root



Results

Table 1. The effects of vibration speed on the growth of tomato seedlings at 24th day after treatments.

Vibration speed (rpm)	Leaf length (cm)	Leaf width (cm)	Root length (cm)	Stem diameter (mm)	Leaf area (cm^2/plant)
Control (0)	8.6 a^z	2.8 a	14.3 a	5.3 ab	171.5 a
100	10.1 a	3.0 a	15.1 a	5.3 ab	182.3 a
150	10.1 a	2.6 a	14.7 a	5.1 b	175.7 a
200	9.8 a	2.6 a	14.2 a	5.4 a	161.9 a

^{z}Mean separation within columns by Tukey's multiple range test at $P = 0.05$.

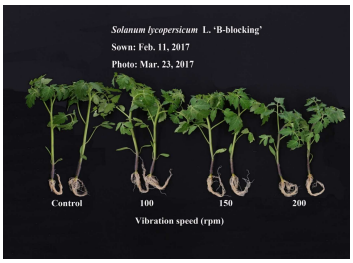


Fig. 1. The effect of vibration speed on the growth of tomato seedlings at 24th day after treatments.

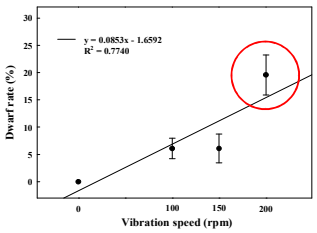


Fig. 2. Regression equation between raising vibration speed & dwarf rate of tomato seedlings at 24th day after treatments.

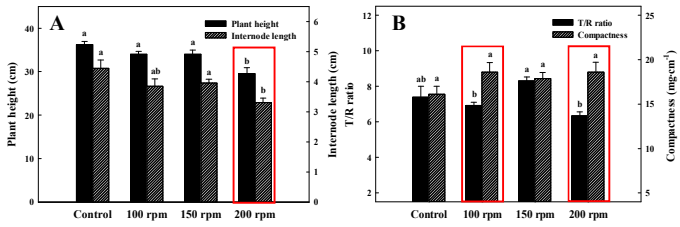


Fig. 3. The effects of vibration speed on the plant height, internode length (A), T/R ratio, compactness (B) of tomato seedlings at 24th day after treatments.

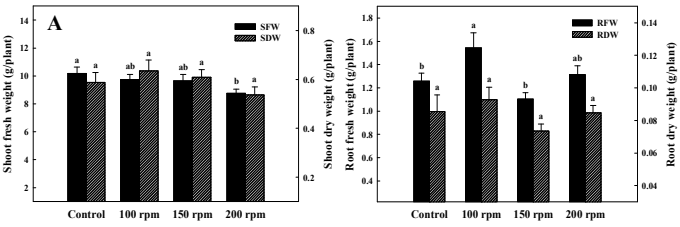


Fig. 4. The effects of vibration speed on the fresh & dry weights of the shoot (A) or root (B) of tomato seedlings at 24th day after treatments.

- As the vibration speed increased, the dwarf rate of tomato seedlings showed positive correlation.
- Stem diameter was significantly thicker in the 200 rpm than the others.
- Plant height & internode length were lowest in the 200 rpm.
- T/R ratio & compactness were greatest in the 100 & 200 rpm.
- The dry weights of shoot or root showed no significant difference in all treatments.

Conclusion

- These results suggest that the vibration speed best achievement in the 200 rpm for growth inhibition of tomato plug seedlings.

Acknowledgement

- This work was carried out with the support of "Cooperative Research Program for Agriculture Science & Technology Development (Project No. PJ01277301)" Rural Development Administration, Republic of Korea.