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REPORT

Effect of Compost Tea against Leaf Scab on Potted Apple Trees - 2007

by

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for

Ecosoil

Effect of compost tea against leaf scab on potted rootstock apple trees

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OBJECTIVE

To evaluate the efficacy of compost tea spray applications against leaf scab on potted rootstock apple trees.

PROCEDURE

MM109 rootstock apple trees that were kept during winter in a cold storage room at $\pm 0.5^{\circ}\text{C}$ were planted in 2ℓ ($\pm 2\text{kg}$) plant pots ($d=175\text{mm}$) in a medium consisting of sand, pine tree bark and compost (4+12+1). Two actively growing shoots were allowed to grow on each potted tree. After planting all trees received a weekly application of a balanced nutrient solution (Hewitt, 1952). Furthermore 10 trees each were exposed to the following treatments:

1. Unsprayed control
2. Compost tea (CT) plus wetter 1ℓ+30ml/hℓ water - sprayed after appearance of symptoms (December 10, 12 days after inoculation of trees)
3. CT plus wetter 5.3ℓ+30ml/hℓ water – sprayed with weekly intervals
4. CT plus wetter 11.1ℓ+30ml/hℓ water – sprayed with weekly intervals
5. CT plus wetter 33.3ℓ+30ml/hℓ water – sprayed with weekly intervals
6. CT plus wetter 1ℓ+30ml/hℓ water – sprayed with weekly intervals
7. CT plus wetter plus microbial nutrients 5.3ℓ+30ml+100ml/hℓ water – sprayed with weekly intervals
8. CT plus wetter plus microbial nutrients 11.1ℓ+30ml+100ml/hℓ water – sprayed with weekly intervals
9. CT plus wetter plus microbial nutrients 33.3ℓ+30ml+100ml/hℓ water – sprayed with weekly intervals
10. CT plus wetter plus microbial nutrients 1ℓ+30ml+100ml/hℓ water – sprayed with weekly intervals

Trees were sprayed four times, starting November 05 (one week after planting), with approximately seven day intervals. Compost tea was prepared and supplied by Ecosoil. Application of the spray mixtures was by a Stihl SR400 Blower to run-off. Inoculation of trees was November 28, one day after the last application of the CT mixtures. Trees were inoculated with a conidial suspension of *Venturia inaequalis* (100 900 viable conidia/ml suspension, 1ℓ applied on 100 trees). During the infection period of 48h at $\pm 17^{\circ}\text{C}$ trees were kept permanently wet by an overhead irrigation system being activated every 30min for 1min (precipitation of $12.9\pm 2.3\text{mm}$). During the incubation period inoculated trees were kept in a glasshouse for 11-12 days when assessments of scab developments were made by the method described by Schwabe (1977). On trees of treatments no 1 and no 2 assessments of conidium production were made by the method described by Schwabe (1980). Data was subjected to statistical analysis.

RESULTS AND DISCUSSION

Table 1 shows scab development on experimental trees after exposure to the different treatments. The same data are given in Fig. 1, however, converted to scab control. Table 2 shows scab development from pooled data from trees sprayed with the same CT doses, however, without and with microbial nutrients. Fig. 2 gives the same data, however, transformed to scab control, while Table 3 and Fig. 3 give the pooled data from all trees that received microbial nutrients and those that were treated only with CT and the wetter. In Table 4 and Fig. 4 the number of conidia produced are given from leaves of untreated control trees and leaves from trees sprayed only once after appearance of symptoms.

The incidence of scab development and scab control was the lowest and the highest, respectively on trees treated with the lowest rate of CT. The rest of the treatments did not differ significantly from the unsprayed control trees. There was a tendency, although not significant, that the higher the CT doses, the higher the scab development and consequently, the lower the scab control. Addition of microbial nutrients to the CT suspensions did not affect its efficacy against scab significantly; however, there was a tendency that it had a negative effect against scab. The CT applied after appearance of symptoms did not reduce production of conidia significantly.

Although obtained data are not giving significant clear cut answers, a few messages can be gathered. In all other experiments conducted on apple trees with CT during the previous season, the latter was applied at full strength from different kinds of compost (1kg compost/10ℓ water). On all compost treated trees scab development was significantly higher than on unsprayed control trees in the first experiment. In the second trial scab development was similar on control and compost treated trees.

My proposal is repeating greenhouse trials with more replicates per treatment, including lower CT doses and exposing experimental trees to different inoculum pressures with reference to conidial concentration.

Table 1 – Scab development on leaves of potted MM109 rootstock apple trees after spraying with compost tea at different doses once (no 2) and 3 weeks, 2 weeks, 1 week and 1 day before inoculation with a conidial suspension of *Venturia inaequalis*

No	Treatment	Scab development (%) ¹
1	Unsprayed control	66.3 a
2	CT + wetter - 1hl + 30ml/hl; applied after appearance of symptoms	60.4 a
3	CT + wetter – 5.3l + 30ml/hl	34.4 b
4	CT + wetter – 11.1l + 30ml/hl	60.4 a
5	CT + wetter – 33.3l + 30ml/hl	61.0 a
6	CT + wetter – 1hl + 30ml/hl	66.9 a
7	CT + wetter + microbial nutrients 5.3l + 30ml + 100ml/hl	50.6 ab
8	CT + wetter + microbial nutrients 11.1l + 30ml + 100ml/hl	66.6 a
9	CT + wetter + microbial nutrients 33.3l + 30ml + 100ml/hl	69.1 a
10	CT + wetter + microbial nutrients 1hl + 30ml + 100ml/hl	68.9 a

¹Values in the same column followed by the same letter do not differ significantly (P=0.5)

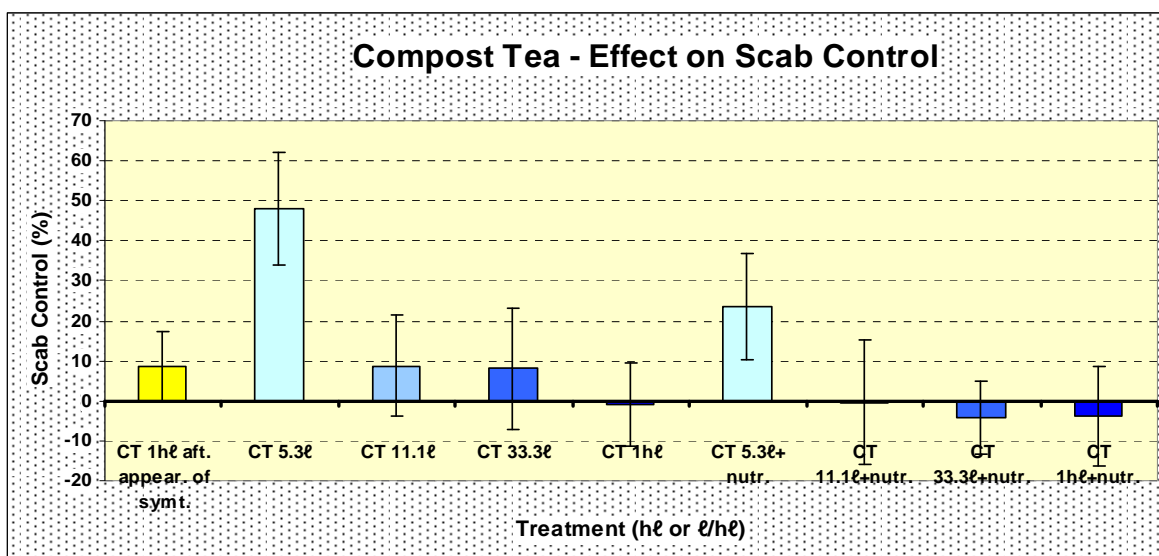


Fig. 1 - Scab control on leaves of potted MM109 rootstock apple trees after spraying with compost tea once after the appearance of symptoms (yellow column) and at different doses 3 weeks, 2 weeks, 1 week and 1 day (columns 2-8) before inoculation with a conidial suspension of *Venturia inaequalis*

Table 2 – Scab development on leaves of potted MM109 rootstock apple trees after spraying with compost tea at different doses 3 weeks, 2 weeks, 1 week and 1 day before inoculation with a conidial suspension of *Venturia inaequalis*. Data pooled from trees sprayed with the same CT doses, however, without and with microbial nutrients

No	Treatment	Scab development (%) ¹
3+7	CT + wetter – 5.3ℓ + 30ml/hℓ pooled with CT + wetter + microbial nutrients 5.3ℓ + 30ml + 100ml/hℓ	42.5 b
4+8	CT + wetter – 11.1ℓ + 30ml/hℓ pooled with CT + wetter + microbial nutrients 33.3ℓ + 30ml + 100ml/hℓ	63.5 a
5+9	CT + wetter – 33.3ℓ + 30ml/hℓ pooled with CT + wetter + microbial nutrients 33.3ℓ + 30ml + 100ml/hℓ	65.1 a
6+10	CT + wetter – 1hℓ + 30ml/hℓ pooled with CT + wetter + microbial nutrients 1hℓ + 30ml + 100ml/hℓ	67.9 a

¹Values in the same column followed by the same letter do not differ significantly (P=0.5)

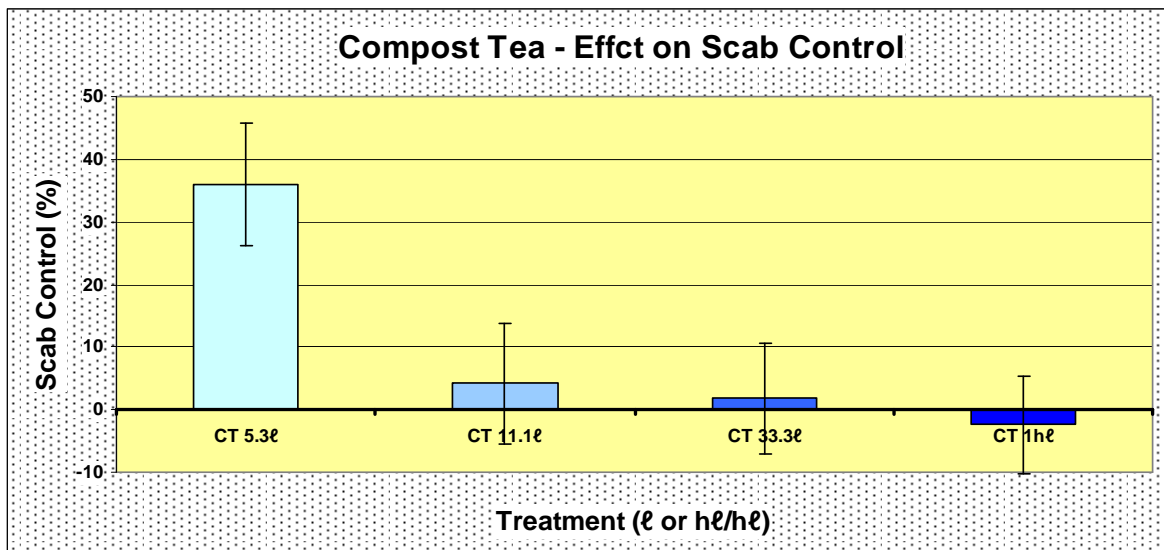


Fig. 2 – Scab control on leaves of potted MM109 rootstock apple trees after spraying with compost tea at different doses 3 weeks, 2 weeks, 1 week and 1 day before inoculation with a conidial suspension of *Venturia inaequalis*. Data pooled from trees sprayed with the same CT doses, however, without and with microbial nutrients

Table 3 - Scab development on leaves of potted MM109 rootstock apple trees after spraying with compost tea at different doses 3 weeks, 2 weeks, 1 week and 1 day before inoculation with a conidial suspension of *Venturia inaequalis*. Data pooled from trees sprayed with different CT doses plus microbial nutrients and those sprayed with different CT doses only

Treatment	Scab development (%) ¹
Addition of microbial nutrients – 100ml/hl	63.8 a
No microbial nutrients	55.7 a

¹Values followed by the same letter do not differ significantly (P=0.5)

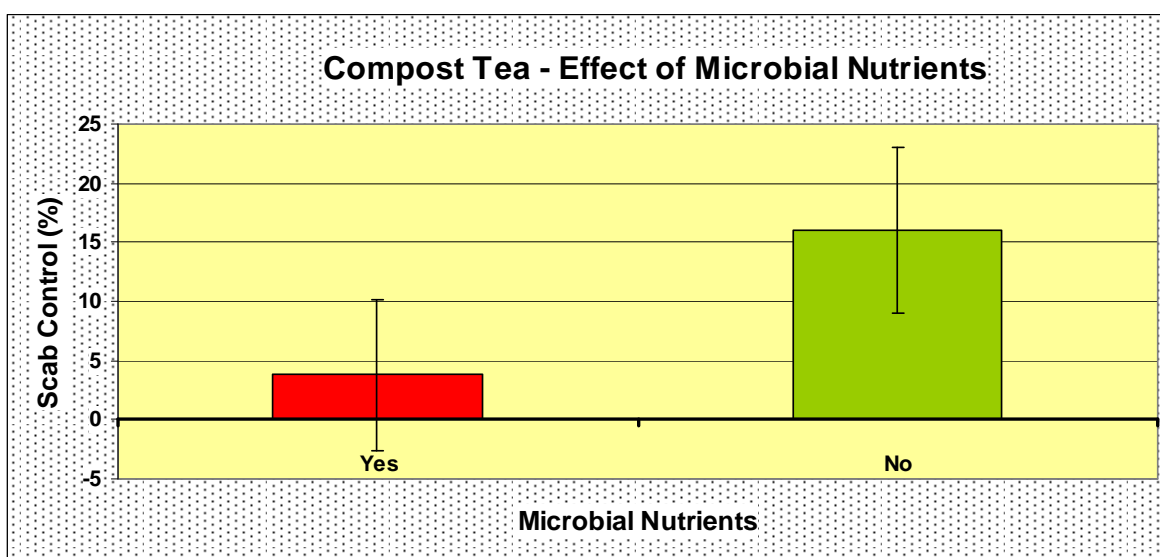


Fig. 3 - Scab development on leaves of potted MM109 rootstock apple trees after spraying with compost tea at different doses 3 weeks, 2 weeks, 1 week and 1 day before inoculation with a conidial suspension of *Venturia inaequalis*. Data pooled from trees sprayed with different CT doses plus microbial nutrients and those sprayed with different CT doses but no microbial nutrients

Table 4 – Conidium production on leaves of potted MM109 rootstock apple trees on unsprayed control trees and trees sprayed once with compost tea after appearance of scab symptoms after inoculation with conidial suspension of *Venturia inaequalis*.

Treatment g or ml/hl	Conidium production ¹
Unsprayed control	584 a
CT + wetter – 1hl+30ml/hl	337 a

¹Values followed by the same letter do not differ significantly (P=0.5)

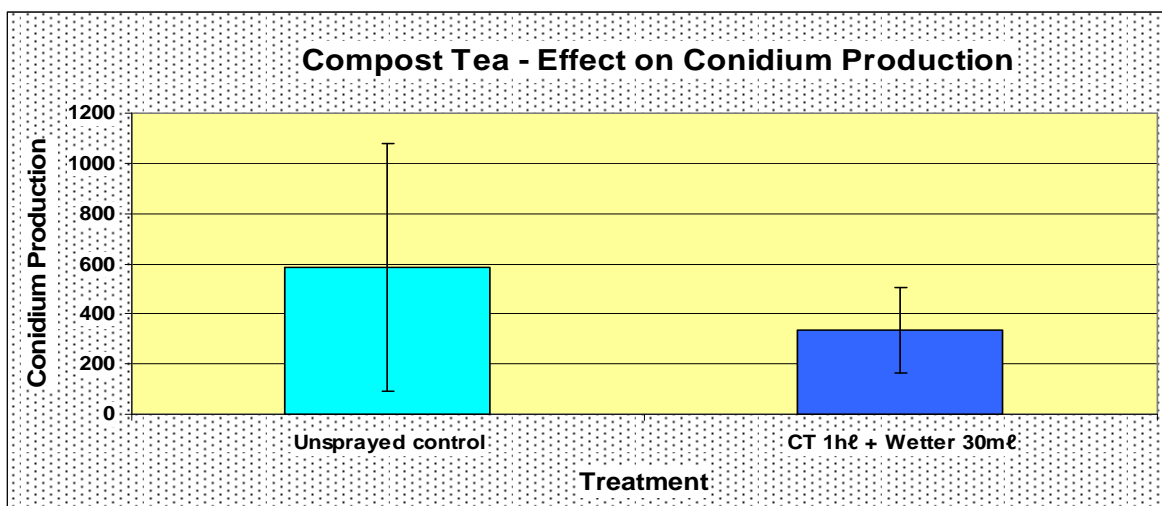


Fig. 4 – Conidium production on leaves of potted MM109 rootstock apple trees on unsprayed control trees and trees sprayed once with compost tea after appearance of scab symptoms after inoculation with conidial suspension of *Venturia inaequalis*.

CONCLUSION

The lowest dose of CT (5.3ℓ/hℓ) controlled scab development significantly on potted MM109 rootstock apple trees, while there was a gradual decrease in efficacy with increasing CT doses. Therefore, my recommendation is to proceed with trials under controlled conditions, using more replicates per treatment, evaluating a wider range of CT doses - especially in the lower ranges and exposing experimental trees to various inoculum pressures, i.e. varying the conidium concentration of the inoculum.

REFERENCES

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