

**TITLE OF PROJECT:** Effect of transplant water treatments on processing tomato establishment and development.

**NAME OF CONTRIBUTOR(S) AND THEIR AGENCY:**

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**BACKGROUND:**

Aside from starter fertilizers, other products are occasionally being used in the transplant water solution by processing tomato growers on the advise of agricultural input suppliers or consultants. Usually there is no data to support the claims made by these individuals. With the increasing value of the Canadian dollar, the economics of processing vegetable production in Southwestern Ontario is becoming more challenging. Producers need to be assured that crop inputs are providing a significant return on their investment.

**METHODS:**

On 18 June, transplants of H9314 were transplanted at the University of Guelph, Ridgetown Campus research farm, using four products, 9-18-9 fertilizer, Remedy (“Farming fro Profit” manure liquefier), Alpine EXP (1% sulfur), and Alpine Zinc (9% zinc) in various combination. The sixteen treatments were applied at 200ml / transplant, using a RJ transplanter. The product combinations, rates, solution E.C, and pH are summarized in Table 1.

**DATA COLLECTION:** Plant fresh weights were taken on 5 plants per plot, three weeks after transplanting and then again in two weeks. Plots were harvested (4 plants per plot) when 80% of the fruit appeared mature. Fruit was graded into mature red and green and expressed as tons/acre as well as a percentage of the total tonnage.

**EXPERIMENTAL DESIGN AND DATA ANALYSIS:**

The experiment was established as a randomized complete block design with 4 replications. A plot consisted of 1 bed (2 rows), 26' (8.0 m) in length. Transplants were established 45 cm apart in double rows which were spaced 45 cm apart. A protected LSD was used to separate treatments with significant differences. Means followed by the same letter within a column do not differ significantly ( $P = 0.05$ ).

**Table 1: Transplant water treatment rates, E.C. levels and solution pH.**

<b>Treatment</b>	<b>Product</b>	<b>Rate (per 100 L)</b>	<b>E.C.</b>	<b>pH</b>
1	water	-	0.38	6.8
2	9-18-9 + Remedy +Alpine EXP + Alpine Zinc	1.0 L 13 ml 66 ml 36 ml	6.16	7.9
3	9-18-9	1.0 L	5.95	7.9
4	Remedy	13 ml	0.67	7.6
5	Alpine EXP	66 ml	0.5	7.2
6	Alpine Zinc	36 ml	0.51	7.2
7	9-18-9 + Remedy	1.0 L 13 ml	6.15	7.8
8	9-18-9 + Alpine EXP	1.0 66 ml	6.31	7.9
9	9-18-9 + Alpine Zinc	1.0 36 ml	6.3	8
10	9-18-9 + Remedy + Alpine EXP	1.0 13 ml 66 ml	6.4	8.1
11	9-18-9 + Remedy + Alpine Zinc	1.0 13 ml 36 ml	3.76	8.4
12	9-18-9 + Alpine EXP + Alpine Zinc	1.0 66 ml 36 ml	6.2	8
13	Remedy + Alpine EXP + Alpine Zinc	13 ml 66 ml 36 ml	1.01	7.8
14	Remedy + Alpine Zinc	13 ml 36 ml	0.56	7.3
15	Alpine EXP + Alpine Zinc	66 ml 36 ml	0.51	7.2
16	Remedy +Alpine EXP	13 ml 66 ml	0.62	7.7

**Remedy** is a “Farm for Profit” Manure Liquefier

**Alpine EXP** contains 1% sulfur

**Alpine Zinc** contains 9 % zinc

## **RESULTS AND DISCUSSION:**

When transplant weight was evaluated 3 weeks after transplanting, the lack of benefit of the additional materials included with the starter fertilizer were apparent (Table 2). With a few exceptions, any transplant water treatment which included 1% 9-18-9 resulted in plants which were significantly larger than treatments receiving water alone. Similarly, plants in treatments which included Remedy, Alpine EXP or Alpine Zinc singly or in combination without starter fertilizer did not significantly differ in size from plants receiving water alone. The same trend was apparent at 35 days after transplanting, but statistical significance was not found in all cases. At both timings, starter fertilizer alone produced plants with the greatest fresh weights. Flowering appeared reduced in many of the treatments with products other than starter fertilizer alone, but data was not collected.

Treatment 11 appears to be incorrect, as the plant response and the EC values do not correlate with other treatment combinations.

Total yields, green fruit and red fruit yields did not significantly differ among treatments, including starter fertilizer alone (Table 4). The data was more variable than expected, possibly due to the dry field conditions in the summer of 2007. Regardless, it is apparent that the addition of Remedy, Alpine EXP and Alpine Zinc to the transplant solution did not provide any yield benefits in 2007.

**Table 2. Effect of transplant starter solutions on tomato fresh and dry weights 21 days after transplanting. Ridgetown Campus, University of Guelph, 2007.**

Trt	Treatment	Fresh Weight (g/plant)	Dry Weight (g/plant)	Percent Dry Wt (g/plant)
1	water	19.4 cd	2.41 cd	12.5
2	9-18-9 + Remedy +Alpine EXP+ Alpine Zinc	49.5 a	5.88 a	11.9
3	9-18-9	50.1 a	5.82 a	11.6
4	Remedy	27.7 a-d	3.32 bcd	12.4
5	Alpine EXP	21.3 cd	2.71 cd	12.8
6	Alpine Zinc	16.4 cd	2.09 d	12.9
7	9-18-9 + Remedy	36.5 abc	4.62 abc	13.1
8	9-18-9 + Alpine EXP	43.9 ab	5.26 ab	12.2
9	9-18-9 + Alpine Zinc	44.6 ab	5.32 ab	12.3
10	9-18-9 + Remedy + Alpine EXP	39.4 abc	4.77 abc	12.4
11	9-18-9 + Remedy + Alpine Zinc	10.1 d	1.38 d	14.3
12	9-18-9 + Alpine EXP + Alpine Zinc	38.1 abc	4.52 abc	11.9
13	Remedy + Alpine EXP + Alpine Zinc	26.5 bcd	3.27 bcd	12.4
14	Remedy + Alpine Zinc	16.9 cd	2.11 d	12.6
15	Alpine EXP + Alpine Zinc	19.4 cd	2.45 cd	12.8
16	Remedy + Alpine EXP	18.6 cd	2.38cd	12.8
LSD		14.26	1.494	-
CV		33.35	28.69	31.09
P-value		0.0001	0.0001	0.729

**Table 3. Effect of transplant starter solution on tomato fresh and dry weights 35 days after transplanting. Ridgetown Campus, University of Guelph, 2007.**

Trt	Treatment	Fresh Weight (g/plant)	Dry Weight (g/plant)	Percent Dry Wt (g/plant)
1	water	206.5 bcd	29.6 bcd	14.5 b-e
2	9-18-9 + Remedy + Alpine EXP + Alpine Zinc	391.7 ab	61.3 a	15.6 abc
3	9-18-9	429.6 a	60.2 a	14.0 e
4	manure liquifier	235.3 bcd	34.2 a-d	14.6 b-e
5	Alpine EXP	182.2 cd	25.8 cd	14.3 cde
6	Alpine Zinc	185.1 cd	27.5 bcd	14.7 b-e
7	9-18-9 + Remedy	292.1 a-d	45.6 a-d	15.5 a-d
8	9-18-9 + Alpine EXP	335.4 abc	55.1 ab	16.1 a
9	9-18-9 + Alpine Zinc	322.1 a-d	52.5 abc	16.1 a
10	9-18-9 + Remedy + Alpine EXP	296.5 a-d	46.7 a-d	15.7 ab
11	9-18-9 + Remedy + Alpine Zinc	132.1 d	18.4 d	14.2 cde
12	9-18-9 + Alpine EXP + Alpine Zinc	376.8 abc	57.8 a	15.4 a-e
13	Remedy + Alpine EXP + Alpine Zinc	265.6 a-d	37.4 a-d	14.5 b-e
14	Remedy + Alpine Zinc	186.1 cd	27.1 bcd	14.5 b-e
15	Alpine EXP + Alpine Zinc	180.7 cd	24.2 cd	14.1 de
16	Remedy + Alpine EXP	189.8 cd	27.2 bcd	14.6 b-e
LSD		116.8	17.2	0.86
CV		31.09	30.53	4.05
P-value		0.0001	0.0001	0.0001

**Table 4. Effect of transplant starter solutions on processing tomato yields. Ridgetown Campus, University of Guelph, 2007.**

Trt	Treatment	Yield Red (T/acre)	Yield Green (T/acre)	Yield Total (T/acre)	Percent Red	Percent Green
1	water	54.7	0.6	55.4	98.7	1.3
2	9-18-9 + Remedy +Alpine EXP + Alpine Zinc	56.7	0.8	57.4	98.7	1.3
3	9-18-9	55.2	1.1	56.2	98.2	1.8
4	Remedy	60	0.6	60.5	99.1	0.9
5	Alpine EXP	51.2	1.8	53	97.2	2.8
6	Alpine Zinc	56.5	1.8	58.3	97.2	2.8
7	9-18-9 + Remedy	52.8	0.6	53.4	98.9	1.1
8	9-18-9 + Alpine EXP	59.3	0.6	59.9	99.2	0.8
9	9-18-9 + Alpine Zinc	52.1	0.6	52.7	99	1
10	9-18-9 + Remedy + Alpine EXP	65	0.7	65.7	99	1
11	9-18-9 + Remedy + Alpine Zinc	56.8	4.4	61.2	93	7
12	9-18-9 + Alpine EXP + Alpine Zinc	50.1	0.4	50.5	99.2	0.8
13	Remedy + Alpine EXP + Alpine Zinc	53.4	1	54.5	98.2	1.8
14	Remedy + Alpine Zinc	54.7	1.8	56.5	97	3
15	Alpine EXP + Alpine Zinc	52.8	2.1	55	96.2	3.8
16	Remedy + Alpine EXP	52.9	1.1	54	98	2
LSD		-	-	-	-	-
CV		17.96	133.91	18.45	2.58	122.13
P-value		0.873	0.1698	0.895	0.1122	0.1108