



Rapid Foliar



Sri Lanka







Tea

TRIAL OF RAPID ZINC ON TEA CULTIVATION

July - September 2014

INTRODUCTION

The major tea growing areas in Sri Lanka are :

-  **Location-1** Kandy and Nuwara Eliya in Central Province
-  **Location-2** Badulla, Bandarawela and Haputale in Uva Province
-  **Location-3** Galle, Matara and MulKirigala in Southern Province
-  **Location-4** Ratnapura and Kegalle in Sabaragamuwa Province

In addition there are six main principal regions that plant tea. These are Nuwara Eliya, Dimbula, Kandy, Uda Pussellawa, Uva Province and Southern Province.

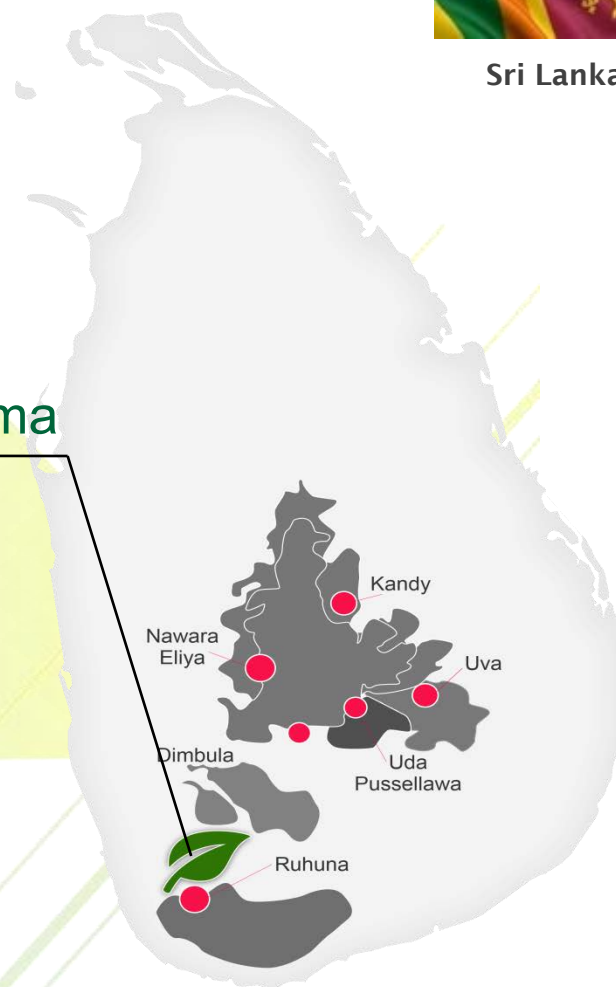
OPEX FERTIQA (PVT) LTD, in partnership with Rural Liquid Fertilisers (RLF), conducted a field trial in the Baddegama area of Galle District in Southern Province to trial the effectiveness of a new fertiliser product to the Sri Lankan market – RLF's RAPID ZINC.

The map opposite identifies the growing areas and shows the trial field location.



Sri Lanka

Baddegama



FIELD TRIAL OBJECTIVE

To evaluate the effectiveness of RAPID ZINC for Tea Cultivation vs Competitor Zinc + Standard ZnSO_4 products.

METHODOLOGY

The plot selected for trial was from a pre-existing crop of approximately 10 years of age.

The trial plot was divided into nine quadrats and each given a number for the purposes of recording current plant status, progress and yield.

The plot size was 25' X 30' with three quadrats each being given a different fertiliser treatment.

The treatments were as follows :

- 🌿 **Control** – Plots No. 1, 2 and 3
- 🌿 **RAPID ZINC Applied** – Plots No. 4, 5 and 6
- 🌿 **Other Zinc Source Applied** - Plots No 7, 8 and 9



Figure 1 : Trial field lay out



RAPID
ZINC



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TRIAL PLOT BASELINE DATA AND TREATMENTS

The following photographs capture the trial plot at the commencement of the evaluation.



Commencement | July 2014



Commencement | July 2014

Figure 2 : Number of tea bushes



Fertiliser Application

Fertiliser application rates were applied in accordance with the following regime.

1. **Control** – Fertiliser Recommendation by Tea Research Institute, Sri Lanka (Normal Fertiliser Practice) + (ZnSO₄ – Zinc Sulphate) at Standard acceptable application rate
2. **RAPID ZINC** – Fertiliser Recommendation by Tea Research Institute, Sri Lanka (Normal Fertiliser Practice) + Rapid Zinc 40ml / 16L of water (Recommended RLF application rate)
3. **Other Zinc Source** - Fertiliser Recommendation by Tea Research Institute, Sri Lanka (Normal Fertiliser Practice) + Other Zinc Source 70ml / 16L of water (Standard acceptable application rate)



The days on which the liquid fertiliser was sprayed were :

JULY 2014						
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

AUGUST 2014						
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

SEPTEMBER 2014						
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

RAPID
ZINC



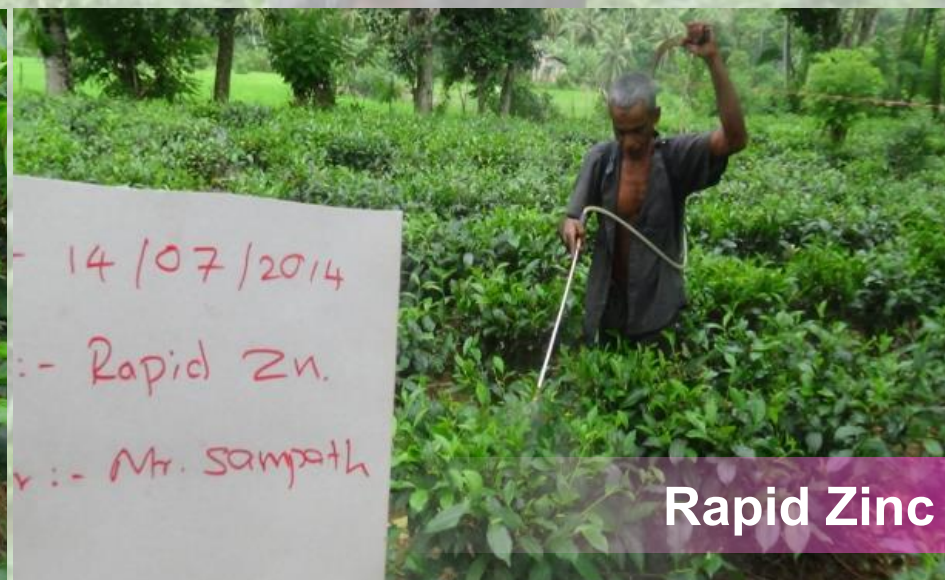
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TRIAL PLOT PHOTO CAPTURE

The following series of photographs highlight the progress and activity of the trial plot during the period of evaluation.



Control



Rapid Zinc

Mr. Sampath's field

Date : July 14th 2014

Rapid Zinc

14/07/2014
- Wuksal Zn
- Mr. Sampath

Wuksal Zn

Date:- 14/07/2014
Trial :- Rapid Zn.
Farmer :- Mr. Sampath

Mr. Sampath's field

Date : July 14th 2014



'Plucking of the tea leaf tips from the Trial Plots'

RAPID
ZINC



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TRIAL PLOT EVALUATION DATA

Fresh leaves by weight per plot in kilograms (kg)

DATE	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9
17 Jul 2014	3	3	3	3	2	4	2	1.5	2
25 Jul 2014	2	1.5	3	2.5	2.5	4	2.5	2	2
2 Aug 2014	3	3	3	3.5	3	4	3	3	2.5
12 Aug 2014	4	3.5	5	4.5	4.5	5.5	4	3.5	4
20 Aug 2014	4	3	3	4	5	3	2.5	2.5	3
1 Sep 2014	7	5	5	5	7	7	5	4	3.5
14 Sep 2014	6	5	7	5	7	9	4	3	3
22 Sep 2014	3	2	3	3	3.5	4	3	2	2.5
30 Sep 2014	2	3.5	2.5	3	3	2.5	3	3	3
8 Oct 2014	2	3	3.5	4	4	4.5	3	2	2

kilograms (kg)

Fresh leaves by weight per bush / per plot in kilograms (kg)

DATE	 PLOT 1	 PLOT 2	 PLOT 3	 PLOT 4	 PLOT 5	 PLOT 6	 PLOT 7	 PLOT 8	 PLOT 9
17 Jul 2014	0.036	0.042	0.038	0.046	0.027	0.05	0.038	0.023	0.032
25 Jul 2014	0.024	0.021	0.038	0.038	0.034	0.05	0.048	0.031	0.032
2 Aug 2014	0.036	0.042	0.038	0.053	0.041	0.05	0.057	0.047	0.04
12 Aug 2014	0.05	0.05	0.0649	0.0692	0.0625	0.0687	0.0769	0.0555	0.0645
20 Aug 2014	0.0481	0.0428	0.0389	0.0615	0.0694	0.0375	0.048	0.0396	0.0483
1 Sep 2014	0.0843	0.0714	0.0649	0.0769	0.0672	0.0875	0.0961	0.0634	0.0564
14 Sep 2014	0.0722	0.0714	0.0909	0.0769	0.0672	0.1125	0.0769	0.047	0.0483
22 Sep 2014	0.0361	0.0285	0.0389	0.0461	0.0486	0.05	0.0576	0.0317	0.0483
30 Sep 2014	0.024	0.05	0.0324	0.0461	0.0216	0.0312	0.0576	0.0476	0.0403
8 Oct 2014	0.0361	0.0428	0.0454	0.0615	0.0555	0.0562	0.0576	0.0317	0.0322

kilograms (kg)

Average leaves by weight per bush in 03 replicates in kilograms (kg)

DATE	CONTROL	RAPID ZINC	OTHER ZINC
17 Jul 2014	0.0386	0.041	0.031
25 Jul 2014	0.0276	0.04	0.037
2 Aug 2014	0.0386	0.048	0.048
12 Aug 2014	0.0543	0.0668	0.0656
20 Aug 2014	0.0432	0.0561	0.0453
1 Sep 2014	0.0735	0.0772	0.0719
14 Sep 2014	0.0781	0.0783	0.0788
22 Sep 2014	0.0345	0.0482	0.0458
30 Sep 2014	0.0354	0.0329	0.0485
8 Oct 2014	0.0414	0.0577	0.0405

kilograms (kg)

RAPID
ZINC



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RESULTS OF EVALUATION

Yield intensification with the application of zinc in comparison to the control tea bushes per ONE ACRE OF TEA :
(Number of tea bushes per one acre of tea land = 5000 bushes)

The following calculation has been done using the above average data.

Example: $0.041 - 0.0386 = 0.0024\text{kg} \times 5000 \text{ bushes} = 12\text{kg}$

DATE	RAPID ZINC FIELD	OTHER ZINC SOURCE FIELD
17 Jul 2014	12	0
25 Jul 2014	62	47
2 Aug 2014	47	47
12 Aug 2014	62.5	56.5
20 Aug 2014	64.5	10.5
1 Sep 2014	18.5	0
14 Sep 2014	1	3.5
22 Sep 2014	68.5	56.5
30 Sep 2014	0	65.5
8 Oct 2014	81.5	0

Raw Trial Data Results

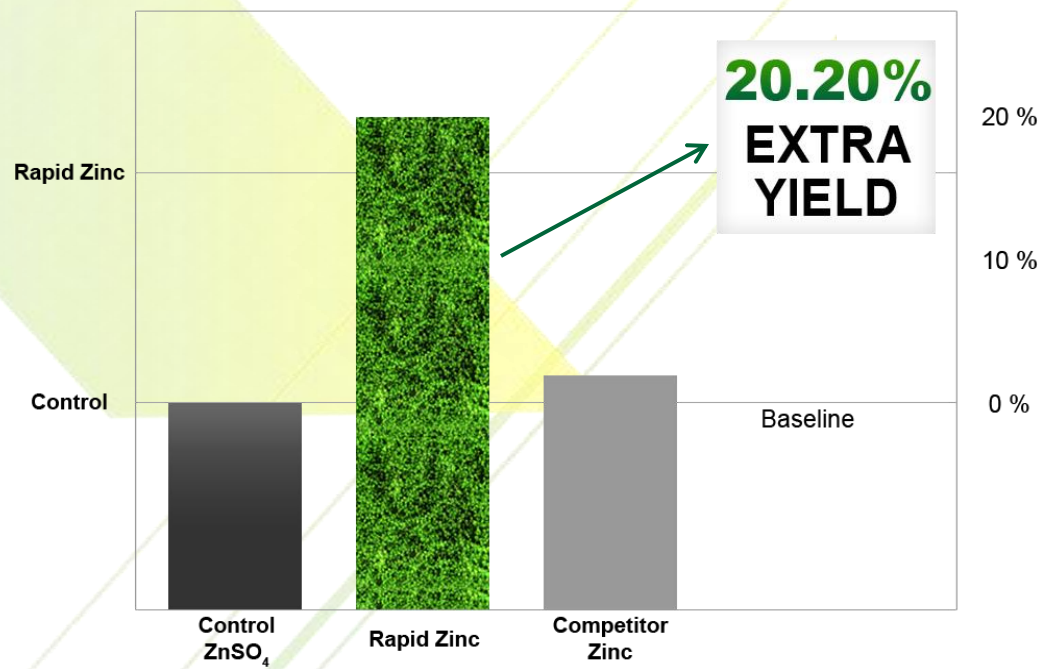
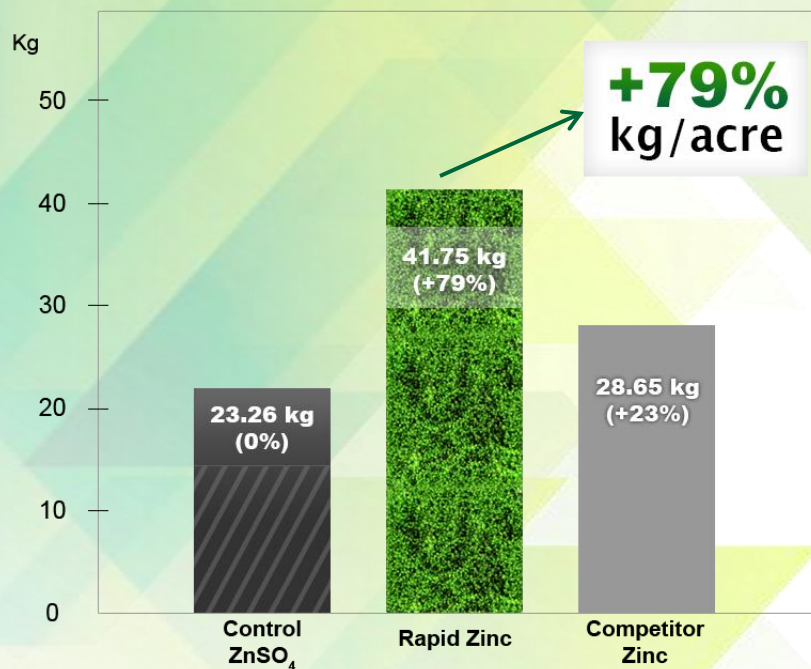
Average Yield Increase per Acre

Control (ZnSO ₄)	+ 23.26kg per Acre (0%)
Rapid Zinc	+ 41.75kg per Acre (+79%)
Competitor Zinc	+ 28.65kg per Acre (+23%)

Dr. H. Nassery Analysis of Trial Data Results (ADDENDUM)

Yield Increase Percentage (%)

Control (ZnSO ₄)	0.0% Baseline
Rapid Zinc	+ 20.24% ↑
Competitor Zinc	+ 1.83% ↑



Economic Benefits - Annually

Control (ZnSO₄)

6 Rounds per year

Product Cost	Rs. 86
Spray Cost	Rs. 6,000
Total Cost	Rs. 6,086

Rapid Zinc

6 Rounds per year

Product Cost	Rs. 8,400
Spray Cost	Rs. 6,000
Total Cost	Rs. 14,400

Competitor Zinc

6 Rounds per year

Product Cost	Rs. 10,448
Spray Cost	Rs. 6,000
Total Cost	Rs. 16,448

RETURNS

Extra Yield	+ 697 kg
Extra Rs.	+ Rs. 48,846

Extra Yield	+ 1252 kg
Extra Rs.	+ Rs. 87,675

Extra Yield	+ 895 kg
Extra Rs.	+ Rs. 60,165

NET ECONOMIC BENEFIT

Net Improvement	Rs. 42,760
	- NIL

Net Improvement	Rs. 73,275
Gain V Control	+ Rs. 30,515

Net Improvement	Rs. 43,717
Gain V Control	+ Rs. 957

**Increase NET
Return** **0%**

**Increase NET
Return** **+71.36%**

**Increase NET
Return** **+2.24%**

AVERAGE Yield Increment per ONE ACRE

- 🌿 **RAPID ZINC – 41.75kg** per one plucking cycle
(12+62+47+62.5+64.5+18.5+1+68.5+0+81.5)/ 10)
- 🌿 **Other Zinc Source – 28.65kg** per one plucking cycle
(0+47+47+56.5+10.5+0+3.5+56.5+65.5+0)/ 10)
- 🌿 **Control ZnSO₄ – 23.26kg** per one plucking cycle

Assumption

- 🌿 Three plucking cycles per month

CONCLUSION

- 🌿 There is demonstrated yield improvement with **RAPID ZINC**.

CONCLUSION

OTHER ZINC **+23%**
Improvement over Control

RAPID ZINC **+79%**
Improvement over Control

ZnSO₄ **0%**
Control

RAPID
ZINC



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ADDENDUM TO REPORT BY RLF



**Rural Liquid
Fertilisers**

RLF Comments of Trial

Dr Hooshang Nassery, RLF's Head of Technical has expressed agreement in the conclusions drawn by his colleagues and counterparts in Sri Lanka. But as he studied the results of the Product Evaluation Report closely he also decided to interpret them using a different approach.

He agrees that the results for Rapid Zinc are positively demonstrated in this report.










However he was even more impressed with the trial and its results when he fully applied the negative values (as compared to the Control) and found that even greater benefits of RLF Rapid Zinc can be demonstrated.

What follows are the workings of the method he used to draw his conclusion :












Dr Hooshang Nassery
- International Technical Director

Fresh leaves by weight per plot in kilograms (kg)

DATE	 PLOT 1	 PLOT 2	 PLOT 3	 PLOT 4	 PLOT 5	 PLOT 6	 PLOT 7	 PLOT 8	 PLOT 9
17 Jul 2014	3	3	3	3	2	4	2	1.5	2
25 Jul 2014	2	1.5	3	2.5	2.5	4	2.5	2	2
2 Aug 2014	3	3	3	3.5	3	4	3	3	2.5
12 Aug 2014	4	3.5	5	4.5	4.5	5.5	4	3.5	4
20 Aug 2014	4	3	3	4	5	3	2.5	2.5	3
1 Sep 2014	7	5	5	5	7	7	5	4	3.5
14 Sep 2014	6	5	7	5	7	9	4	3	3
22 Sep 2014	3	2	3	3	3.5	4	3	2	2.5
30 Sep 2014	2	3.5	2.5	3	3	2.5	3	3	3
8 Oct 2014	2	3	3.5	4	4	4.5	3	2	2
Total per Plot	37	32.5	38	37.5	41.5	47.5	32	26.5	27.5
Total per Treatment	107.5			126.5			86		
No./bush per lot	83	70	70	65	72	80	52	63	62
kg/bush	0.45	0.46	0.54	0.58	0.58	0.59	0.62	0.42	0.44
Mean kg/bush	0.48			0.58			0.49		
As % of Control (no zinc)	100			120.24			101.83		

Fresh leaves by weight per bush / per plot in kilograms (kg)

DATE	 PLOT 1	 PLOT 2	 PLOT 3	 PLOT 4	 PLOT 5	 PLOT 6	 PLOT 7	 PLOT 8	 PLOT 9
17 Jul 2014	0.04	0.04	0.04	0.05	0.03	0.05	0.04	0.02	0.03
25 Jul 2014	0.02	0.02	0.04	0.04	0.03	0.05	0.05	0.03	0.03
2 Aug 2014	0.04	0.04	0.04	0.05	0.04	0.05	0.06	0.05	0.04
12 Aug 2014	0.05	0.05	0.06	0.07	0.06	0.07	0.08	0.06	0.06
20 Aug 2014	0.05	0.04	0.04	0.06	0.07	0.04	0.05	0.04	0.05
1 Sep 2014	0.08	0.07	0.06	0.08	0.07	0.09	0.01	0.06	0.06
14 Sep 2014	0.07	0.07	0.09	0.08	0.07	0.11	0.08	0.05	0.05
22 Sep 2014	0.04	0.03	0.04	0.05	0.05	0.05	0.06	0.03	0.05
30 Sep 2014	0.02	0.05	0.03	0.05	0.02	0.03	0.06	0.05	0.04
8 Oct 2014	0.04	0.04	0.05	0.06	0.06	0.06	0.06	0.03	0.03

Dr Nassery's comments give further insight into his reasoning :

*"I studied the results of Sri Lanka tea trial with Rapid Zinc and another Zinc product carefully and have calculated the data based on total harvest over all plucking periods. My findings are presented in the tables as shown on pages 25 and 26, as 1) **kg per bush** and 2) **as percentage of control**.*

*My results show that the increase in yield using **Rapid Zinc** was **20.24%** and for the **Other Zinc** source was **1.83%**.*

I explored the report and its results for quite some time, querying why the data showing yield increase per bush appeared over-estimated for the Other Zinc source. I then came to the view that this aberration appeared because, where the yield of any zinc treatment for a plucking period is less than Control, it is shown as a zero, and not its actual negative value. This single fact I believe has impacted the results because the Other Zinc treatment recorded zero three times with a greater negative value than the one zero of Rapid Zinc."



Dr Hooshang Nassery
- International Technical Director

It is through the constant application of well-managed scientific trials and demonstration plots that the products produced and supplied by RLF can be thoroughly tested and the results examined for individual markets throughout the world.

RLF is grateful to its Sri Lankan partners for the dedicated work they do in presenting RLF's products to their clients and offering them the opportunity to be involved in trials such as these in an effort to gain greater yields and financial returns. The move towards modern-farming techniques with high-technology products and Integrated Fertiliser Management programs is something that RLF is proud to partner.

THANK YOU FOR VISITING OUR PRESENTATION

www.ruralliquidfertilisers.com

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