Ministry of Agriculture, Livestock and Irrigation
Department of Agriculture
Perennial Crops Division

Effect of different latex harvesting systems on the sustainability of natural rubber production

ရေရှည်တည်တံ့သော ရော်ဘာထုတ်လုပ်ရန်အတွက် အစေးခြစ်စနစ်အမျိုးမျိုး၏အကျိုးသက်ရောက်မှုကို လေ့လာခြင်း

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Introduction

- ✓ Native – tropical rain forest of Amazone
- ✓ A tree crop for industrial production of latex
- ✓ Majority of the planted area is owned by smallholders.
- ✓ There is no tapping in rainy season.

Rubber plantation

Tapping

Latex dripping

Latex collecting

Rationale

- ✓ Common tapping systems – S/2 d1, S/2 d2
- ✓ It requires a stable, qualified and large number of tapping labour
- ✓ Labour cost is the most significant expenses of latex harvesting.
- ✓ Efficient yield stimulant must be applied to receive optimum production by reducing tapping costs (Rodrigo et al., 2011)
- ✓ Minimizing the cost of latex harvesting through the development of proper tapping systems is the appropriate way to solve this problem.

Objectives

1. to assess the efficiency of different tapping systems on the sustainable natural rubber production
2. to investigate the bark consumption of different tapping system
3. to compare the profitability of different tapping system

Background of experimental area

- ✓Situated – 8.63 miles far away from Mawlamyine, situated beside Mawlamyine–Thanphyuzayat highway road
- ✓Area – 557 ac (research 285 ac)
- ✓Annual Rain fall – 4638 mm (183–200 inches)
- ✓Raining days – 124 days
- ✓Temperature – 23º C – 32 ºC
- ✓Soil pH – 5.75
- ✓Soil Texture – Sandy Clay Loam

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Materials and methods

- Design – RCB
- Replication – 4
- Plot size – 10 plants/plot
- Experimental area – 1 ac (200 plants)
- Tested Clone – PB 235
- Spacing – 20 ft x 9 ft
- Planted year – 1994
- Tapping method – downward tapping

Treatments (tapping systems) used in the experiment

Treatment	Tapping system	Description
T 1	S/2 d1	Half spiral cut downward at daily tapping
T 2	S/2 d2 (Control)	Half spiral cut downward at alternate daily tapping
T 3	S/2 d3	Half spiral cut downward at third daily tapping
T 4	S/2 d4 ET 2.5 % Pal (1) 3/y	Half spiral cut downward at forth daily tapping, stimulated with ethephone 2.5 % active ingredient with 1 g of stimulant applied on panel on 1 cm band, 3 applications per year
T 5	S/3 d2	Third spiral cut downward at alternate daily tapping

Tapping intensity

Treatment	Tapping system	Tapping intensity (%)
T 1	S/2 d1	200
T 2	S/2 d2	100
T 3	S/2 d3	67
T 4	S/2 d4 ET 2.5 % Pal (1) 3/y	50
T 5	S/3 d2	67

Tapping intensity = 4 × spiral× tapping frequency× 100 %

Data collection

- Latex yield

  (gram/tree/tap and lb/ac/yr)
- Dry rubber content (DRC)
- Bark consumption
- Tapper productivity
- profitability

Collecting latex

Weighing rubber latex by individual clones

Latex coagulation

Rubber sheeting

Rubber sheet drying

Rubber sheet weighing

Results and Discussion

Table 1. Average three year yield of the five treatments during 2017 to 2019

Treatment	2017-2018		2018-2019		2019-2020		Average	
	g/t/t	lb/ac/yr	g/t/t	lb/ac/yr	g/t/t	lb/ac/yr	g/t/t	lb/ac/yr
T1	27.86	1950.00	22.05	1923.79	31.20	2045.99	27.04 d	1973.26 a
T2 (control)	36.86	1786.17	35.80	1734.80	38.25	1853.52	36.97 c	1791.50 b
T3	50.77	1565.59	49.11	1514.41	52.34	1614.01	50.74 b	1564.67 bc
T4	65.82	1420.78	60.80	1312.42	71.58	1545.12	66.07 a	1426.11 c
T5	34.32	1663.08	30.00	1453.74	37.74	1828.81	34.02 c	1648.54 b
LSD (0.05)							5.16	249.54
CV (%)							7.69	8.81

g/t/t = gram/tree/tapping
lb/ac/yr = no. of tapping days × g/t/t ×no. of plants per acres ÷ 454 g
T1 : S/2 d1; T 2: S/2 d2 ; T3 : S/2 d3; T 4 : S/2 d4 ET 2.5 % Pal (1) 3/y ; T 5: S/3 d2
Different letters in the column Indicates a significant difference in the tapping system at $P < 0.05$

Table 2. Average three year Dry Rubber Contents of the five treatments

Treatments	Dry Rubber Content (DRC) %
T1	30.30 d
T2 (control)	40.78 b
T3	49.38 a
T4	49.45 a
T5	38.60 c
LSD (0.05)	0.2867
CV (%)	4.48

T1 : S/2 d1; T 2: S/2 d2 ; T3 : S/2 d3; T 4 : S/2 d4 ET 2.5 % Pal (1) 3/y ; T 5: S/3 d2
Different letters in the column indicates a significant difference in the tapping system at $P < 0.05$

Table 3. Tapping frequency and tapper productivity of each system

Treatments	Annual tapping days	Cost per acre (MMK)	Tapper productivity
T1	220	660000	1 task
T2 (control)	110	330000	2 tasks
T3	70	210000	3 tasks
T4	49	162000	4 tasks
T5	110	330000	2 tasks

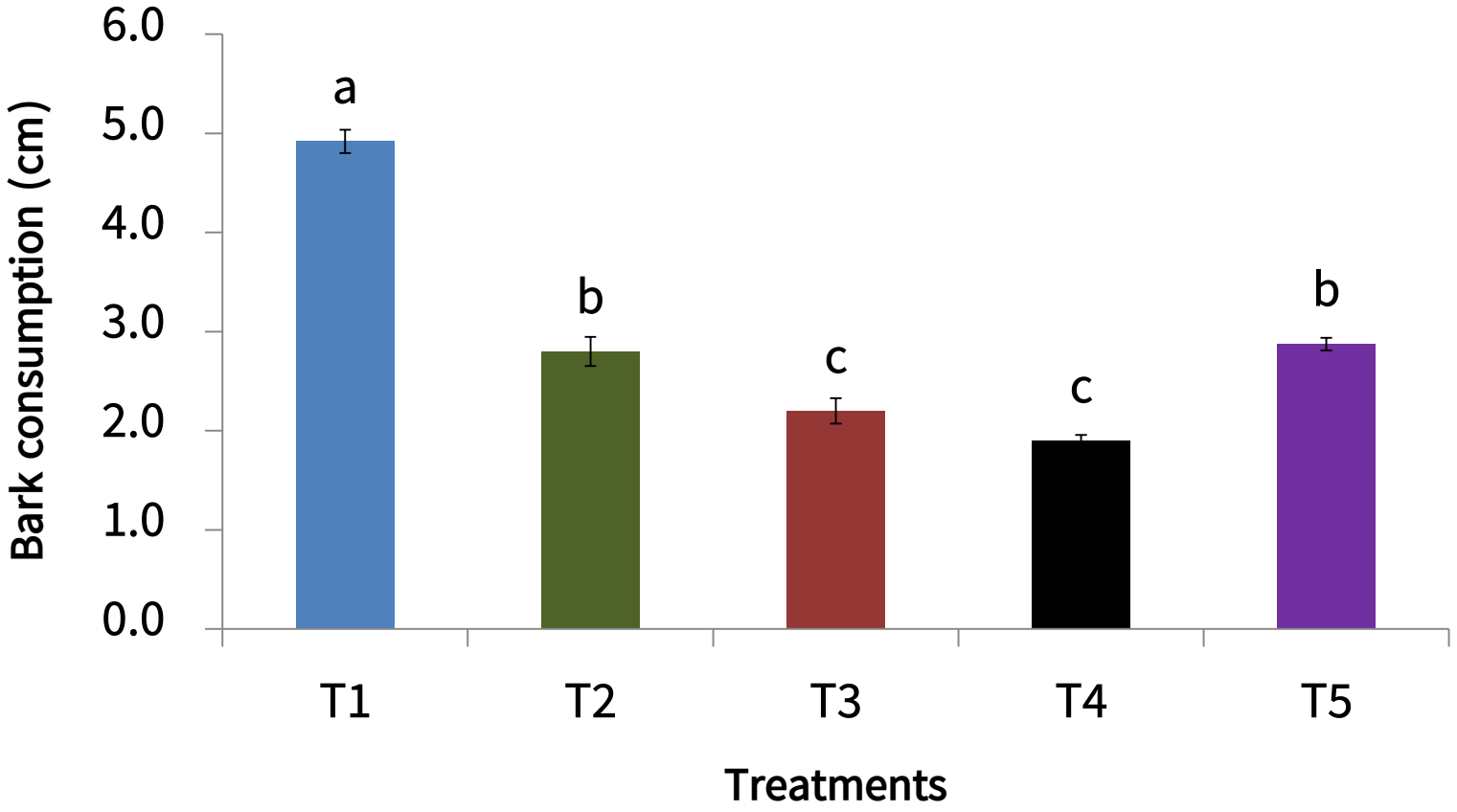

Fig 1 . Bark consumption of the five treatments per month: T1 : S/2 d1; T 2: S/2 d2 ; T3 : S/2 d3; T 4 : S/2 d4 ET 2.5 % Pal (1) 3/y ; T 5: S/3 d2 ; different letters above each bar indicate significant difference at $p \leq 0.05$ by Least significant difference test.

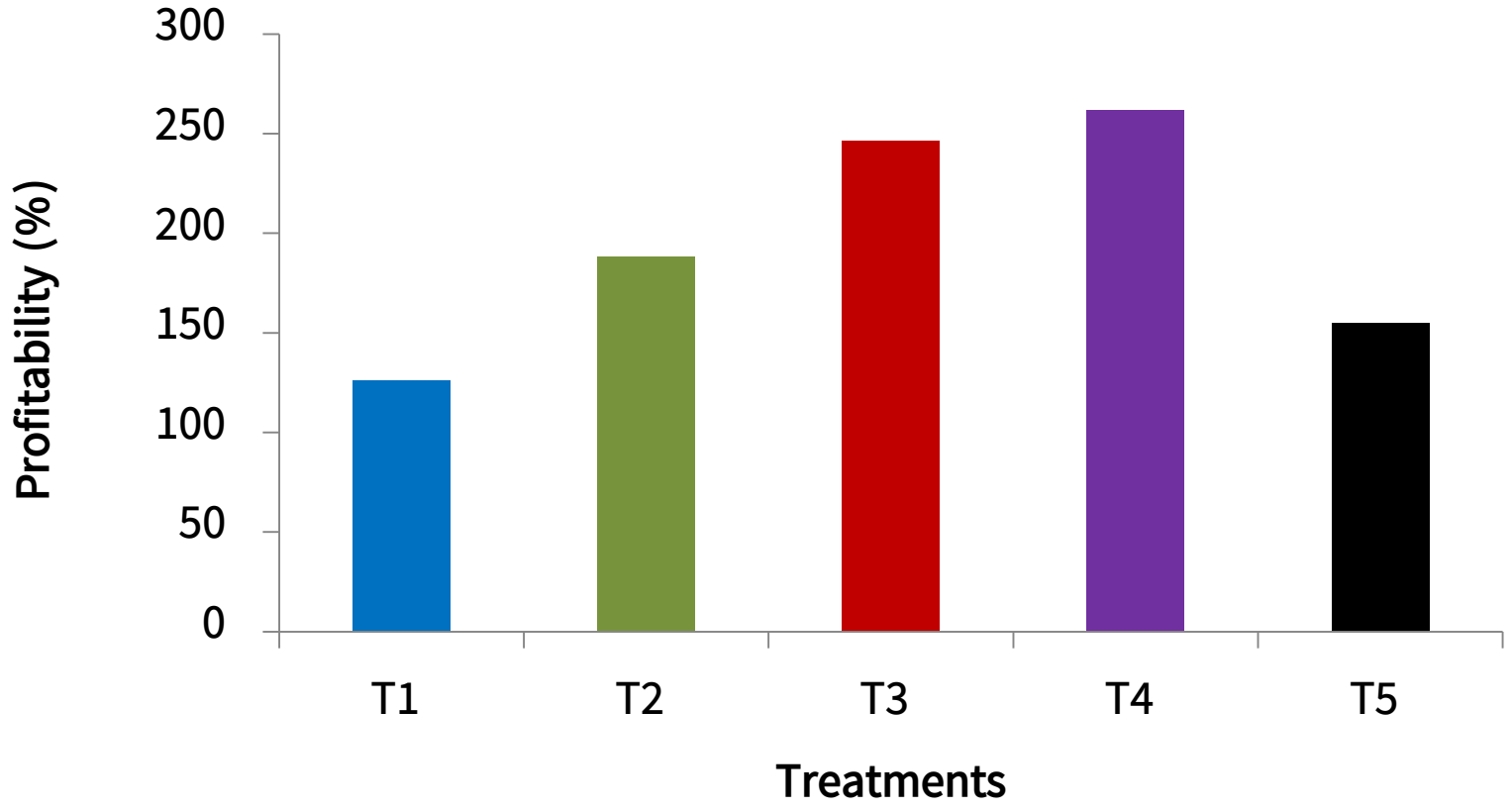

Fig 2. Profitability of the five treatments per year : T1 : S/2 d1; T 2: S/2 d2 ; T3 : S/2 d3; T 4 : S/2 d4 ET 2.5 % Pal (1) 3/y ; T 5: S/3 d2

Conclusion

✓T4 (S/2 d4, ET 2.5 % Pal (1) 3/y) gave higher yield and dry rubber content

✓ T3 (S/2 d3) gave higher yield than conventional tapping system (T2: S/2 d2)

✓However annual yield of T4 (S/2 d4 ET 2.5 % Pal (1) 3/y) is lower than conventional tapping system T2 (S/2 d2)

Conclusion (Cont')

✓Low frequency tapping system (T4) reduce bark consumption and increase tapper productivity and longer economic lifespan of the tree.

✓ Low frequency tapping system (T4) increase profitability due to reducing the cost of production under current situation of high labor wages.

Suggestion

✓ The results provide a guideline for rubber farmers to optimize latex production by choosing the most appropriate latex harvesting system, to improve labor productivity on the sustainable of natural rubber production

Future plan

✓ Conducting this research continuously next year

✓Transfer proper tapping systems to extension agents/farmers of all rubber growing States/Regions


THANK YOU