စိုက်ပျိုးရေး၊ မွေးမြူရေးနှင့်ဆည်မြောင်းဝန်ကြီးဌာန

စိုက်ပျိုးရေးဦးစီးဌာန

နှစ်ရှည်သီးနှံဌာနခွဲ

Effect of different tapping systems on natural rubber production of PB 235 Clone in Mon State, Myanmar

ဦးဇင်မျိုးလင်း

ဒု-ဦးစီးမှူး

နှစ်ရှည်ပင်များသုတေသနနှင့်နည်းပညာဖွံ့ဖြိုးရေးခြံ(မုဒုံ)

၂၀၂၃ ခုနှစ်၊ မတ်လ (၈) ရက်

Introduction

Natural Rubber in the world (2021)

Production Area - 12,929,189 ha

Production - 14,021,988 ton

Yield - 1084.52 kg/ha

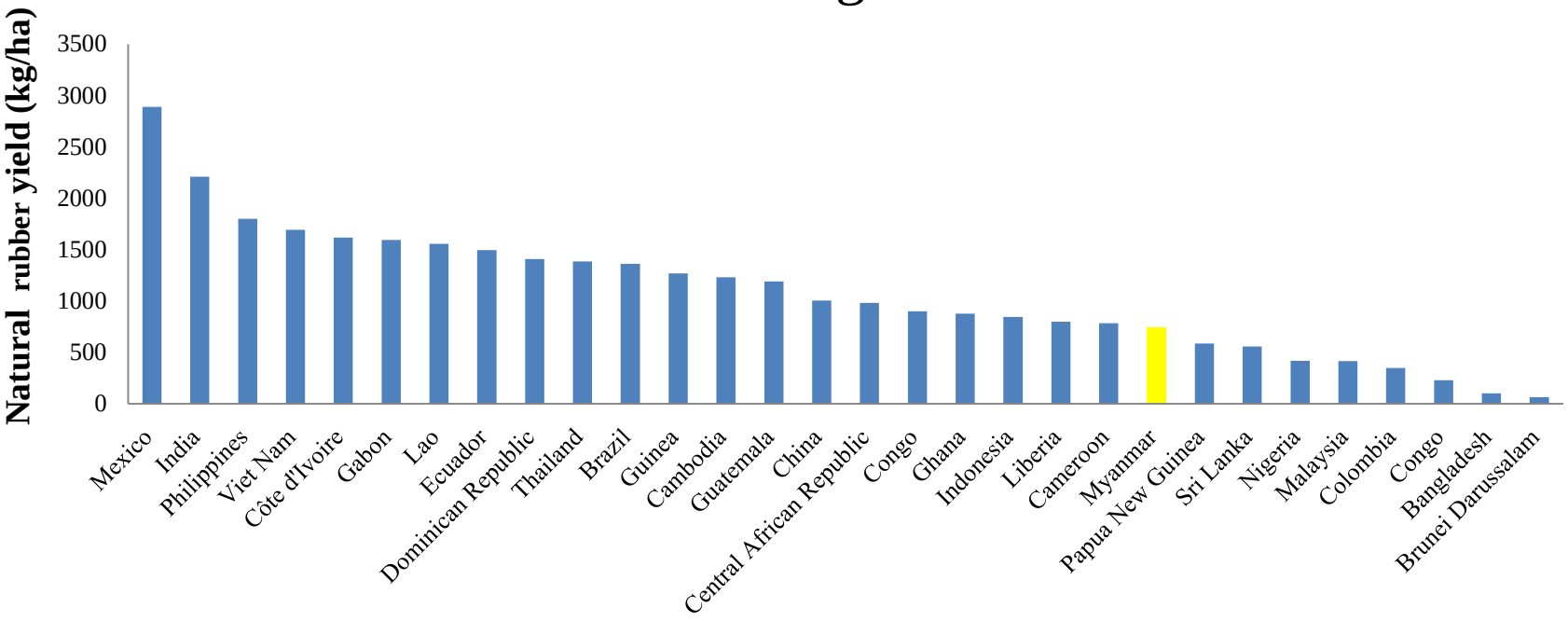


Fig.1. Natural Rubber yield (kg/ha) among rubber producing countries. (Source: FAOSTAT)

Introduction (Cont.)

Myanmar's Rubber Production (2021)

Table(1)Rubber cultivated and harvested area of Myanmar,2021-2022 source: MOALI (2022)

No.	Division/ State	Growing Area (ac)	Tapping Area(ac)	Yield (lb/ac)	Total yield (lb)	Total yield (Mt)
1	Kachin	82470	10447	574	5996593	2721
2	Kaya	66	-	-	-	-
3	Karen	271111	260386	631.5	164432658	74606
4	Chin	9	-	-	-	-
5	Sagaing	12534	670	336.30	225323	102
6	Tannintharyi	349121	193275	652.38	126089552	57209
7	Bago	118042	57222	688.36	39389123	17872
8	Mandalay	114	-	-	-	-
9	Mon	501719	330014	628.82	207518924	94156
10	Yakhine	34346	2217	507.75	1125685	511
11	Yangon	44323	10269	469.01	4816261	2185
12	Shan	184727	78718	476.75	37529168	17028
13	Ayeyarwadi	36375	4620	746.84	3450408	1566
	Total	1634957	947838	623.07	590573695	267956

Introduction (Cont.)

Table.2 Annual rainfall and raining days of Mon State.				
No.	Year	Rainfall(mm)	Raining days	Remarks
1	2007	4277	128	*Source*; (Meteorology and Hydrology Department, Mon State)
2	2008	4339	143	
3	2009	4524	155	
4	2010	2888	120	
5	2011	5504	150	
6	2012	4412	155	
7	2013	4928	165	
8	2014	4333	134	
9	2015	4417	130	
10	2016	3493	131	
11	2017	3678	150	
12	2018	4656	136	
13	2019	6180	132	
14	2020	3878	124	
15	2021	3847	137	
16	2022	4782	144	

Introduction (Cont.)

RRIM guideline for ethephon stimulation

Table 3. guideline for ethephon application.

Panel	Tapping system	Stimulation schedule		
		Initial	Option	
			Option 1	Option 2
BO-1	S/2d2	ET 1.5% La 2/y	ET 1.5% La 3/y	Et 2.5% La 2/y
	S/2d3	ET 1.5% La 3/y	ET 1.5% La 4/y	ET 2.5% La 3/y
	S/2d4	ET 1.5% La 6/y	ET 1.5% La 8/y	ET 2.5% La 6/y
	S/2d6	ET 1.5% La 12/y		ET 2.5% La 12/y

Option 1 : If the yield response is less than 10% of targeted yield (yearly)

Option 2 : If the yield response is less than 15-20% of targeted yield (yearly)

Introduction (Cont.)

Recommended clone	- PB 235
Origin	- Malaysia
Parents	- PB5/51□ × S/78 ð
Phytophthora leaf fall	- Highly resistant
Tapping panel dryness	- Highly susceptible
Inorganic phosphate (Pi)	- High
Sucrose level	- Very low

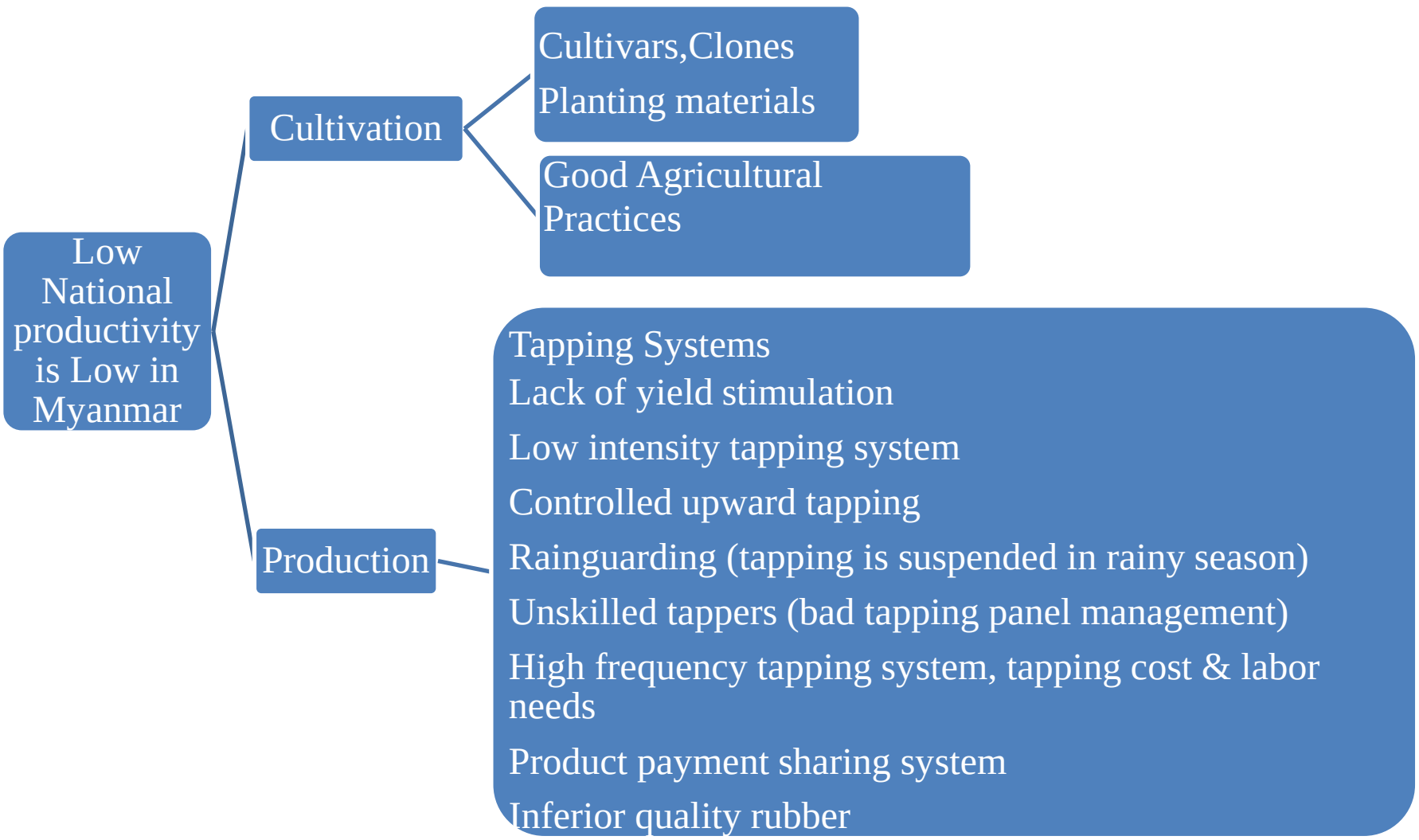
(rubberclones.cirad.fr/index.php/PB235)

Objective

- To evaluate the effectiveness of different tapping systems on rubber yield and profitability of PB 235 clone.

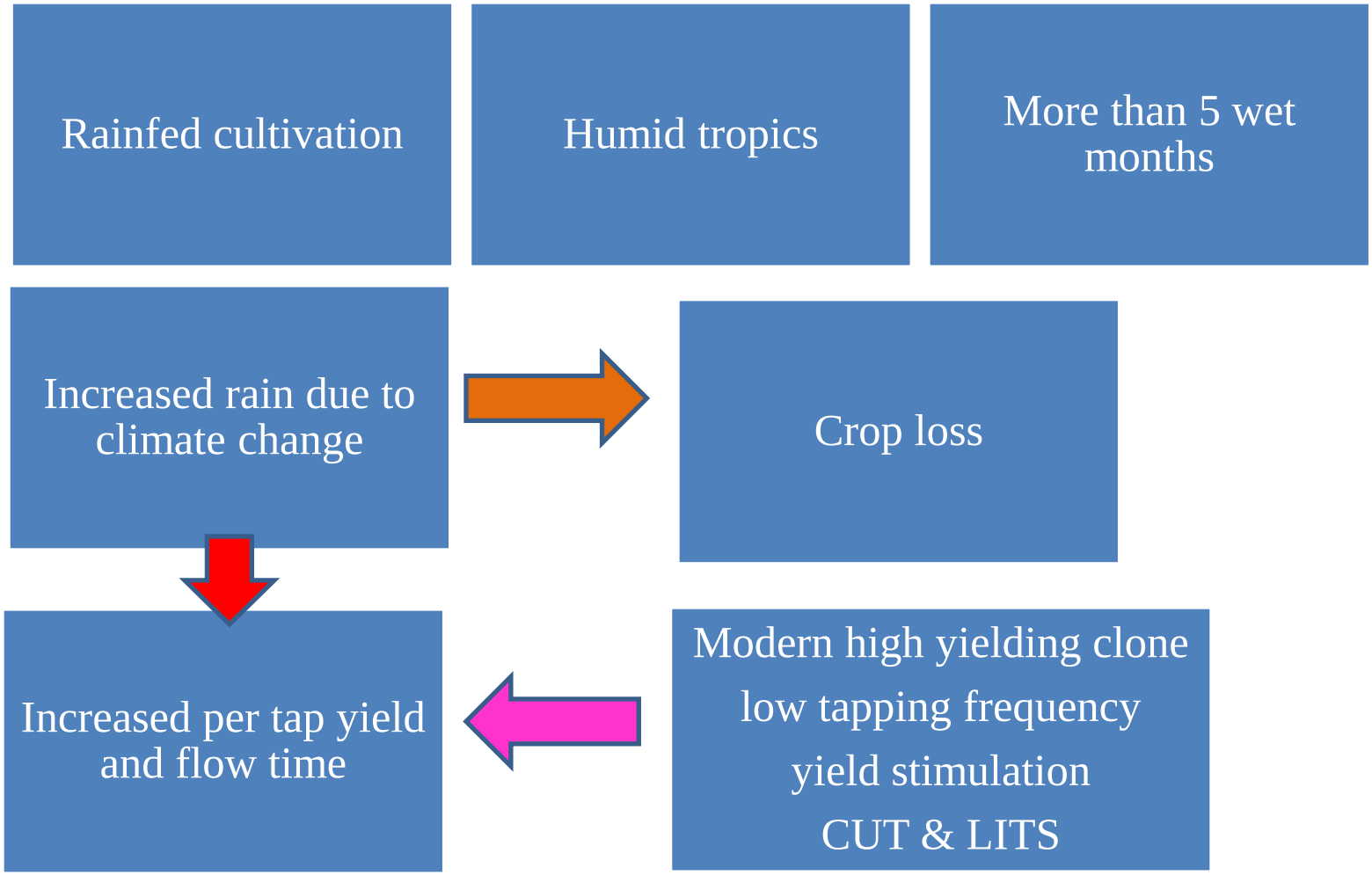
Problem statement

Why the natural rubber productivity is low in myanmar?



Problem statement

Factors associated with crop loss



(DR K R Vijayakumar, INRC 2012)

Materials and methods

Study site: PCRDE, Mudon, Mon State, Myanmar

10.33 meters above sea level

pH- 4.33

Treatments: T1- S/2d2 (Control)

T2- S/2 RG d2

T3- S/3 RG d2

T4- S/2d3ET1.5%La(1)3/y

T5- S/2RGd3ET1.5%La(1)4/y

T6- S/2RGd3ET2.5%La(1)3/y

T7- S/2RG2d3 5m(Jun- Oct)/12;S/2d2 7m(Nov-May)/12

Design:	One Tree Plot (RCB)	Replication:	10
Rubber clone:	PB 235	Plant age:	13 years
Plant spacing:	7m x 3m	Total area:	1.1acres
Planting Date:	2010	Data collection:	10 trees/treatment

Materials and methods

Weeding	- twice a year
Fertilizer application	- Pre moonson/ Post moonson 15:7:18:2 ratio of N:P:K:Mg 0.5kg/tree/time
Rainguard fitting	- 2nd week of May 2022
Tapping panel	- BO-1
Plant girth range	- 64.2-72.3 cm
Length of Tapping cut	- 30 cm
Tapping method	- Downward Tapping, Rainguarding
Panel control	- Mancozeb 0.375% (5g/ liter) Weekly spraying
Data collection	- Daily , monthly, 9 months, one year - TSC (Frying Pan Method)

Materials and methods

Table (4) Stimulation schedule for one year tapping.

Treatments	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
T1-S/2 d2												
T2-S/2 RG d2												
T3-S/3 RG d2												
T4-S/2 d3.ET1.5%La(1)3/y						√	√		√			
T5-S/2 RG d3.ET1.5%La(1)4/y			√			√	√		√			
T6-S/2 RGd3.ET2.5%La(1)3/y			√			√			√			
T7 - S/2RG2d3 5m(Jun-Oct)/12; S/2d2 7m(Nov-May)/12												

Measurement parameters

- Rainfall and Temperature Records
- Rubber Yield (g/t/t, kg/t, lb/ac, DRC%)
- Bark Consumption (cm)
- Tapping Panel Dryness (TPD %)
- Tapper's Productivity
- Cost and Benefit

Statistix (Version 8.0)

Results and Discussion

Rainfall, Raining days and Temperature Records

Table(5) Rainfall and temperature collection in 2022 (Mudon).

No.	Months	Raining days	Rainfall (mm)	Maximum Temperature °C	Minimum Temperature °C
1	April	6	41.4	35.6	24.6
2	May	24	773.4	32.63	23.96
3	June	20	541.5	31.3	23.9
4	July	27	982.7	30.8	23.7
5	August	23	1621.0	29.7	23.5
6	September	20	505.5	30.97	23.8
7	October	11	169.4	32.8	23.1
8	November	4	42.93	33.4	22.7
9	December	1	30.99	32.3	21
	Total	**136**	**4708.82**	**32.17**	**23.36**

Remark - Good soil moisture in June-December favourable to prolonged latex flow time.

Results and Discussion

Tapping days

Table(6)Total tapping days during 9 months from April to December 2022.

	T1	T2	T3	T4	T5	T6	T7
Target Tapping days	92	138	138	61	92	92	163
Actual Tapping days	71	137	137	45	91	91	160
Tappable days(%)	77%	99%	99%	73%	99%	99%	99%

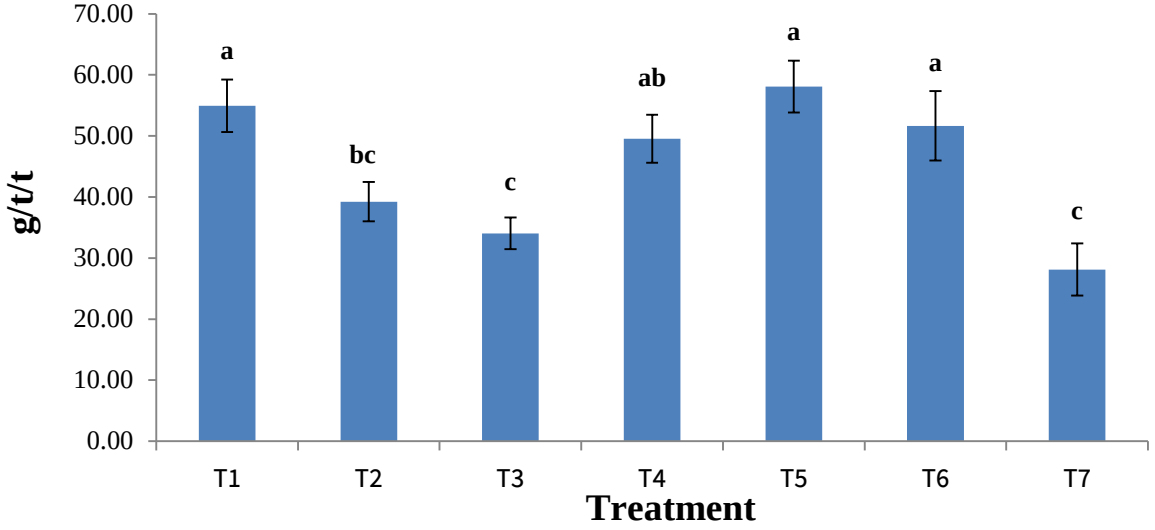
Remark - More tapping days by rainguarding.

Table(7)TPD severity stage of different tapping systems within 9 months.

	T1	T2	T3	T4	T5	T6	T7
TPD %	0.9	1.5	4.1	10.1	13.1	5.3	23
Score	1	1	1	1	1	1	2
Severity Stage	VL	VL	VL	VL	VL	VL	L

VL=Very Low, L=Low **TPD% - 1-20% is very low severity stage(VL) (Okoma et al. 2011)**

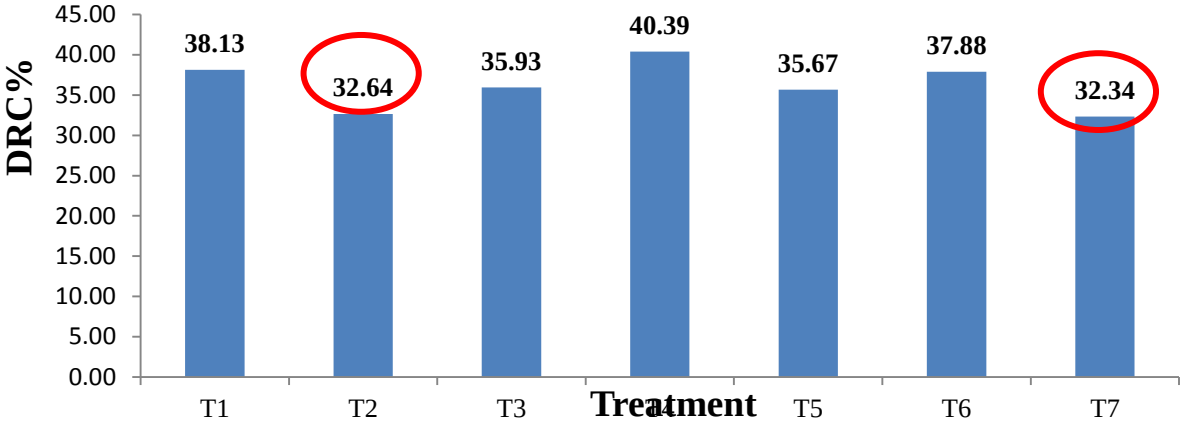
Results and Discussion



High yielding clone under Recovery/compensatory tapping with low frequency stimulation Increase yield

DR K R Vijayakumar,INRC 2012

Fig.2 Comparing g/t/t of different tapping systems within 9 months.



More frequent tapping reduce DRC

Fig.3 Comparing DRC% of different tapping systems within 9 months.

Results and Discussion

Table(8) Comparison of tapping intensity among the treatments.

Treatments	Relative Intensity %	Actual Intensity %	Average Bark Consumption (cm)	Cumulative yield (g/t)
T1(Control)	100%	51.82%	9.63d(100)	3899.04b
T2	100%	100%	17.13b(177)	5341.43a
T3	100%	66.67%	16.96b(176)	4627.16ab
T4	67%	32.85%	6.66e(69)	2381.43c
T5	67%	66.42%	12.01c(124)	5291.99a
T6	67%	66.42%	12.71c(132)	4704.81ab
T7	133% ,100%	128.10%, 102.48%	21.26a(220)	4476.03ab

Results and Discussion

Table(9) Tapper requirements in the seven treatments.

No.	Treatments	**No. of tapped tree per day**	No. of Tapper requirement
1	T1(Control)	1200	3(100)
2	T2	1200	3(100)
3	T3	1200	3(100)
4	T4	800	2(67)
5	T5	800	2(67)
6	T6	800	2(67)
7	T7	1600	4(133)

Task size = 400; Number of trees for tapping =2400 trees; Figures in parenthesis indicate percentage of tapper requirement compared to that of T1.

Results and Discussion

Table(10) Summary of Experimental results from April to October.

Treatments	g/t/t	Lb/ac	Tapping day	TPD severity	Bark Consumption (cm)	DRC%	Costs/ac (Kyats)	Profits/ac (Kyats)	Tapper's productivity (lb)/day
T1 (C)	54.93a	1544.49	71	0.9	9.63 d	38.13	607390	1400447	48.43
T2	39.22bc	2127.58	137	1.5	17.13 b	32.64	1004590	1761264	34.51
T3	34.03c	1846.32	137	4.1	16.96 b	35.93	1004590	1395626	30.00
T4	49.53ab	882.68	45	10.1	6.66 e	40.39	551170	596314	43.97
T5	58.09a	2093.46	91	13.1	12.01 c	35.67	899030	1822469	51.21
T6	51.65a	1861.37	91	5.3	12.71 c	37.88	894370	1525411	45.53
T7	28.11c	1781.19	160	23	21.26 a	32.34	1066690	1248857	24.78

Prevailing Rubber Price-1 lb = 1300 kyats

Conclusion and Recommendation

- The cumulative yield of LFRTS with rainguard are more effective than the conventional tapping system (S/2d2) . *(DR K R Vijayakumar,INRC 2012)*
- Among them ,S/2RGd2 & S2RGd3 ET1.5%La(1)4/y tapping systems were profit per acre.
- But Bark Consumption of S2RGd3 ET1.5%La(1)4/y tapping system was 53 % lower than S/2RGd2 .
- Lower bark Consumption can prolong the economic life span and also provides increase time for bark renewal.
- S2RGd3 ET1.5%La(1)4/y tapping system could reduce 33% tapper requirement.
- Rainguarding is essential for latex harvest of high yielding clones with low incidence of TPD under d3.

Conclusion and Recommendation

- Further studies for more years in this clone to reveal the effects of rainguarding and LITS on rubber production.
- Undertake the dessemination of the best results getting from this experimental test and provide to the farmers by conducting field days.

Activities Photos

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THANK YOU ALL