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REPORT OF PRODUCT TESTING TRIAL 2019-20

Effect of RCM-HARIT SANJIVANI on Growth, Yield and Nutrient Uptake of paddy

SUBMITTED BY

ASSOCIATE DIRECTOR OF RESEARCH
ZONAL AGRICULTURAL RESEARCH STATION
WESTERN GHAT ZONE, IGATPURI,
DIST. NASIK – 422403

Title of the Project	:	**Effect of RCM-HARIT SANJIVANI on growth, yield, nutrient uptake of paddy**
1.) Name and address of Research Institute	:	Zonal Agricultural Research Station, Igatpuri, Dist. Nasik – 422 403
2.) A.) Name of Implementing officer	:	Dr. Y. J. Patil, Assistant Professor (Soil Sci. & Agril. Chemistry), ZARS, Igatpuri, Dist. Nasik)
B.) Name of staff Associated	:	Dr. D. V. Kusalkar, Associate Director of Research, ZARS, Igatpuri, Dist. Nasik Dr. H. M. Patil, Associate Professor (Agronomy), ZARS, Igatpuri, Dist. Nasik Dr. S. D. Patil, Asstt. Professor (Agril. Entomology) ZARS, Igatpuri, Dist. Nasik
3.) Name of Company	:	M/S. Vyenkatesh Agrotrade Pvt. Ltd., D-13, Silver Heights, Opp. Hotel Sandeep, Gurudvara Road, Mumbai Naka, Nasik- 422 009
4.) Product	:	RCM-HARIT SANJIVANI
5.) Crop and Season	:	**Crop:-** Paddy **Season :-** *Kharif* 2019
6.) Type of study	:	Growth, yield, chlorophyll and uptake of nutrients
7.) Pest/disease/weed/testing of seed etc.	:	Testing of the product (RCM-HARIT SANJIVANI)
8.) Amount Received (DD no.)	:	Rs. 70,000/-, DD No. 271894 dated-25 /07/2019
9.) 10 % institutional charges remitted DD no.& date	:	Rs. 7,000/-, Cheque No.627325 dated-13/09/2019
10.) Acceptance letter of DOR Office	:	DOR/ADR/DDR-III/T-3/TEST/953/2019, dated- 4 July 2019

Assistant Professor
Soil Science & Agril. Chemistry
ZARS, Igatpuri-422 403 (Nashik)

ASSOCIATE DIRECTOR OF RESEARCH
Zonal Agriculture Research Station
IGATPURI-422 403.

A). Experimental Details :

a.) Crop : Paddy
Variety : *Indrayani*
Year : 2019-20
Season : *Kharif* 2019
Soil Type : Entisol
Plot size : Gross:- 4.80 m x 2.40 m
Net:- 4.40 m x 2.00 m
Design : RBD
No. of treatment : Six
No. of replication : Four
Spacing : 15 - 25 cm x 15 - 25 cm.

General Recommended dose of nutrients : Uniform dose of 56 kg N: 30 kg P_2O_5 through Urea- DAP briquettes (@ 170 kg ha^{-1}) + 10 t FYM ha^{-1} and 50 kg K_2O through MOP per ha^{-1} was given to all the treatments after transplanting.

Date of transplanting : 15/07/2019

Observations recorded :

1. Yield
2. Total Chlorophyll content
3. Vegetative and growth of the plant
4. Soil Chemical properties (Initial & at harvest)
5. Uptake of nutrients.

B.) Treatment details:

Application of RCM-Harit-Sanjivani (grams per acre)

Treatments		Stage (I) (soil application after transplanting)	Stage (II) (foliar spray at 30 DAT)	Stage (II) (foliar spray at 45 DAT)	Stage (II) (foliar spray at 60 DAT)
T1	(No application)	0	0	0	0
T2	Soil and foliar application of RCM-Harit-Sanjivani (grams per acre)	150	75	125	150
T3	Soil and foliar application of RCM-Harit-Sanjivani (grams per acre)	200	100	150	200
T4	Soil and foliar application of RCM-Harit-Sanjivani (grams per acre)	250	125	175	250
T5	Soil and foliar application of RCM-Harit-Sanjivani (grams per acre)	300	150	200	300
T6	Soil and foliar application of RCM-Harit-Sanjivani (grams per acre)	350	200	250	350

Note:-
Uniform dose of 56 kg N:30 kg P_2O_5 through Urea- DAP briquettes(@ 170 kg ha^{-1}) and 50 kg K_2O through MOP per ha^{-1} + 10 t FYM ha^{-1} was given to all the treatments

Assistant Professor
Soil Science & Agril. Chemistry
ZARS, Igatpuri-422 403 (Nashik)

ASSOCIATE DIRECTOR OF RESEARCH
Zonal Agriculture Research Station
IGATPURI-422 403

Table1. Initial Soil Analysis

Sr. No.	Parameters	Value
1	pH (1:2.5)	6.81
2	EC (dSm^{-1})	0.11
3	Organic carbon (%)	0.39
4	Available Nitrogen (kg ha^{-1})	164.0
5	Available P (kg ha^{-1})	18.4
6	Available K (kg ha^{-1})	144.0
8	DTPA extractable micronutrients	
	i.) Fe (ppm)	22.12
	ii.) Mn (ppm)	17.19
	iii.) Zn (ppm)	0.62
	iv.) Cu (ppm)	2.10
9	Soil Texture (%)	
	i.) Sand	22
	ii.) Silt	52
	iii.) Clay	26
	iv.) Textural class	Silty loam

The initial soil status presented in Table 1. The soil belongs to Entisol, which is neutral in reaction with low in available nitrogen, potassium and moderate in available phosphorus content. The DTPA extractable micronutrients were sufficient.

Methodology:

Application of RCM-Harit-Sanjivani to paddy crop

RCM-Harit -Sanjivani is in a powder form and its application is given below

Stage I :- Soil application immediate after transplanting

Stage II :- Three Foliar spray at 30, 45 and 60 days after transplanting

Assistant Professor
Soil Science & Agril. Chemistry
ZARS, Igatpuri-422 403 (Nashik)

ASSOCIATE DIRECTOR OF RESEARCH
Zonal Agriculture Research Station
IGATPURI-422 403.

Table 2: Effect of foliar application RCM- HARIT SANJIVANI on yield and yield attributing parameters of paddy

Treatment	Grain yield (q ha^{-1})	Straw yield (q ha^{-1})	1000 grain wt. (g)	Plant height (cm) at harvest	No. of tillers per hill at harvest
T1	34.24	40.05	20.62	90.77	13.07
T2	35.51	41.61	20.46	91.04	13.73
T3	38.71	46.49	20.49	92.58	14.39
T4	42.20	51.37	21.55	95.28	15.76
T5	43.42	52.58	21.65	95.34	15.96
T6	40.18	49.56	20.84	94.43	15.21
SE ±	1.84	2.01	0.37	0.95	0.51
CD at 5 %	5.39	5.85	1.10	2.78	1.49
CV %	9.64	9.52	3.89	3.03	6.95

Table 3: Effect of foliar application of RCM- HARIT SANJIVANI on total nutrients uptake by paddy

Treatment	Total nutrients uptake (Kg ha^{-1})		
	N	P	K
T1	73.13	12.99	55.53
T2	79.14	13.88	58.77
T3	83.51	15.26	62.57
T4	90.30	16.12	67.14
T5	91.78	17.13	68.93
T6	89.26	15.89	65.34
SE ±	2.76	0.62	1.98
CD at 5 %	8.08	1.80	5.79

Assistant Professor
Soil Science & Agril. Chemistry
ZARS, Igatpuri-422 403 (Nashik)

ASSOCIATE DIRECTOR OF RESEARCH
Zonal Agriculture Research Station
IGATPURI-422 403

Table 4 : Effect of foliar application of RCM- HARIT SANJIVANI on soil chemical properties after harvest of rice

Treatment	pH (1:2.5)	EC (dSm^{-1})	O.C. (%)	Soil available nutrients (kg ha^{-1})		
				N	P	K
T1	6.80	0.11	0.39	148.35	12.62	130.30
T2	6.80	0.12	0.39	150.90	12.90	131.80
T3	6.79	0.12	0.40	151.48	13.29	135.25
T4	6.77	0.12	0.40	158.08	14.58	134.63
T5	6.81	0.12	0.39	160.90	14.83	135.15
T6	6.77	0.12	0.39	156.05	14.47	134.93
SE ±	0.05	0.01	0.01	2.80	0.38	3.28
CD at 5 %	NS	NS	NS	8.20	1.10	NS
Initial	6.81	0.11	0.39	164.0	18.4	144.0

Table 5: Effect of foliar application of RCM- HARIT SANJIVANI on total chlorophyll content of paddy

Treatment	Total Chlorophyll (mg g^{-1} of fresh leaf) (30 DAT)	Total Chlorophyll (mg g^{-1} of fresh leaf) (60 DAT)
T1	1.57	1.54
T2	1.61	1.59
T3	1.65	1.71
T4	1.75	1.80
T5	1.77	1.82
T6	1.69	1.73
SE ±	0.03	0.03
CD at 5 %	0.09	0.10

Assistant Professor
Soil Science & Agril. Chemistry
ZARS, Igatpuri-422 403 (Nashik)

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Results:-

Effect of soil and foliar application of RCM- HARIT SANJIVANI on yield and yield attributing parameters of rice

The growth parameters of rice were significantly influenced by soil and foliar application of RCM- HARIT SANJIVANI (Table 2). Plant height and number of tillers per hill were increased with increase in the levels of soil and foliar application of RCM- HARIT SANJIVANI. The higher plant height (95.28 cm) was noticed in the treatment (T5) application of RCM- HARIT SANJIVANI 300:150:200:300 g $acre^{-1}$, however, it was found at par with the treatment T4 & T6 (Similar trend was noticed in case of thousand grain weight and number of tillers per hill of rice crop.

Effect of soil and foliar application of RCM- HARIT SANJIVANI on yield of rice

There was a positive response in attaining increased grain and straw yield of rice with soil and foliar application of RCM- HARIT SANJIVANI (Table 2). The significant grain yield was noticed with the treatment T5 application of RCM- HARIT SANJIVANI 300:150:200:300 g $acre^{-1}$ (43.42 q ha^{-1}) over all the treatment except treatment T4 application RCM- HARIT SANJIVANI 250:125:175:250 g $acre^{-1}$ (42.20 q ha^{-1}) and T6 (40.18 q ha^{-1}) which are at par.

The straw yield of rice was found significantly increased with the soil and foliar application of RCM- HARIT SANJIVANI, the highest straw yield (52.58 q ha^{-1}) was significantly recorded in the treatment of T5 (application of RCM- HARIT SANJIVANI 300:150:200:300 g $acre^{-1}$) however, it was on par with the treatment T4 & T6 (table 2).

Nutrient uptake

Soil and foliar application of RCM- HARIT SANJIVANI significantly increased total N, P, K uptake by rice crop (Table 3). The highest N, P, K uptake was significantly noticed in the treatment T5. However, this treatment was found at par with the treatment T4 and T6.

Soil chemical properties

Soil and foliar application of RCM- HARIT SANJIVANI increased soil available N and P content (Table 4). The higher available N (160.9 kg ha^{-1}) and P (14.83 kg ha^{-1}) content was significantly noticed in the treatment T5 over all the treatment except treatment T4 and T6 which are at par.

Assistant Professor
Soil Science & Agril. Chemistry
ZARS, Igatpuri-422 403 (Nashik)

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Total Chlorophyll content

There was increase in total chlorophyll content at 30 and 60 days after transplanting with increase in the levels of soil and foliar application of RCM- HARIT SANJIVANI (Table 5). Significantly the highest chlorophyll content was noticed in the treatment T5 Soil and foliar application of RCM- HARIT SANJIVANI 300:150:200:300 g $acre^{-1}$ (1.77 mg g^{-1} of fresh leaf) at 30 days after transplanting and (1.82 mg g^{-1} of fresh leaf) at 60 days after transplanting followed by treatment T4 and T6 and found at par with each other.

Conclusion

Application of 56 kg N:30 kg P_2O_5 through Urea- DAP briquettes (@ 170 kg ha^{-1}) and 50 kg K_2O through MOP ha^{-1} + 10 t FYM ha^{-1} along with soil and foliar application of RCM-HARIT SANJIVANI powder @ 300:150:200:300 g $acre^{-1}$ to transplanted paddy was found beneficial for higher grain yield, straw yield, higher chlorophyll content and increase in total nutrient (NPK) uptake.

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General view of the trial at vegetative growth stage

Foliar spray of Harit Sanjivani

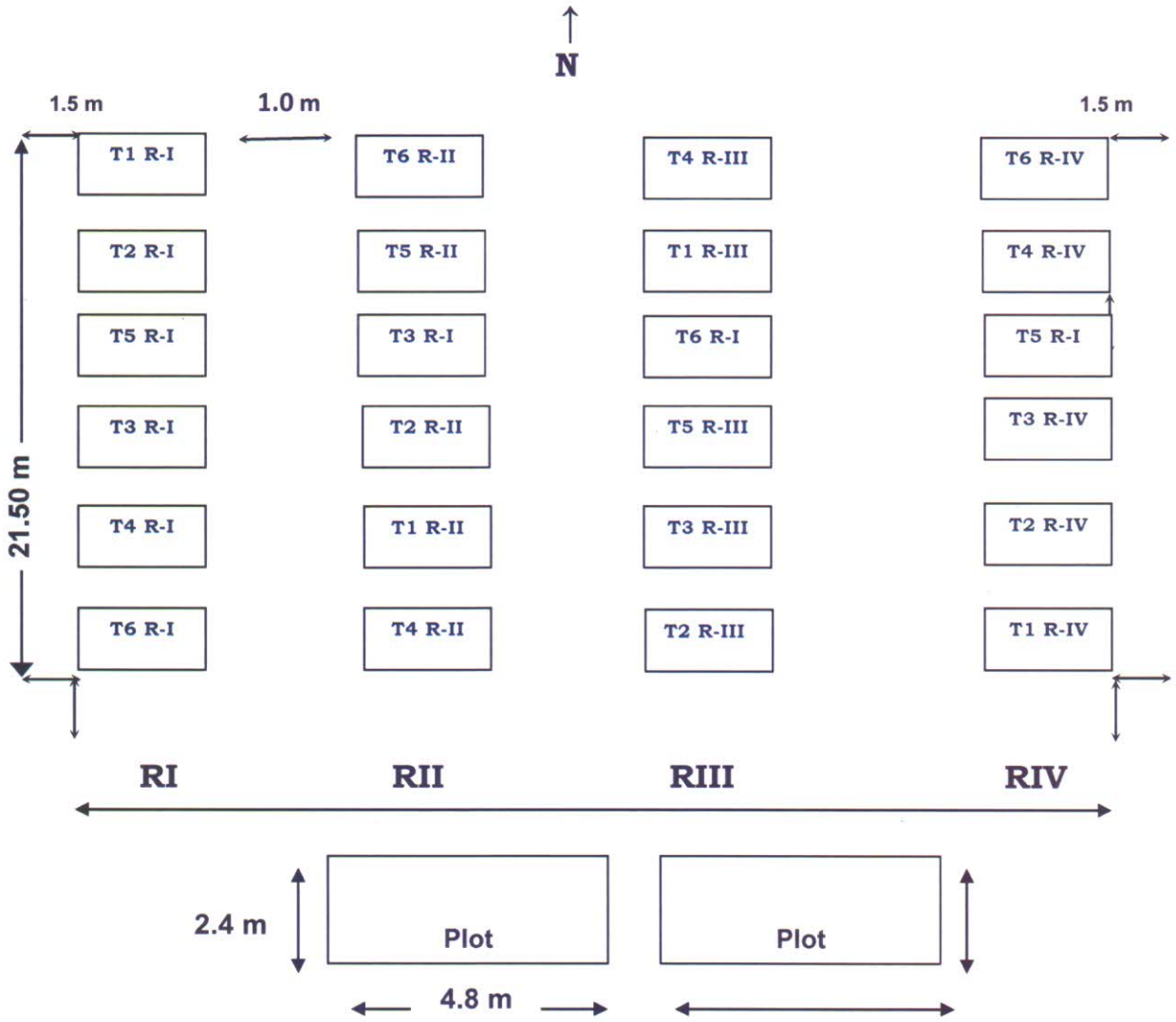

Fig. Plan of layout of experiment