

PROGRESS REPORT

(Ambia bahar - 2017)



**To evaluate the performance of Pearl of Sea
on Citrus (*Citrus reticulata*)**



**JAWAHARLAL NEHRU KRISHI VISHWA VIDYALAYA
ZONAL AGRICULTURAL RESEARCH STATION
CHHINDWARA (M.P.) 480 001**

Progress Report (2017-18)

1. Name and address of the sponsored : M/S NIVSHAKTI BIOENERGY PVT. LTD.
Junaid Manzil 2nd Floor, 7 B, Ahiripukur
Road, Kolkata - 700 019, West Bengal.
2. Project Title : To evaluate Bio-efficacy and product
impact on flowering and fruit setting rate on
Citrus (*Citrus reticulata*)
3. Name and address : JNKVV, Zonal Agricultural Research Station
Chhindwara - 480001 (M.P.)
4. Scientist incharge : Dr. V. K. Paradkar
Associate Director Research
JNKVV, ZARS Chhindwara
5. Scientist associated : Mr. Satish Kadwey
Subject Matter Specialist (Horticulture)
JNKVV, ZARS, TMC, Chhindwara.
6. Variety : Nagpur mandarin
7. Period : Ambia bahar - 2017
8. Objectives : 1 To determine the effect of Physio
Activators "**Pearl of Sea**" on Citrus

: 2 Comparison with grower standard.



Brief introduction about Centre Chhindwara

The area under citrus in Madhya Pradesh is estimated to be 74,815 ha of which 55,640 ha is under oranges (*Citrus reticulata* Blanco), 11,116 ha under acid lime (*Citrus aurantifolia* Swingle), and 8,698 ha under sweet oranges (*Citrus sinensis* Osbeck), as per official record of Directorate of Horticulture and Farm Forestry of the state. The area under citrus cultivation is increasing gradually. In Madhya Pradesh orange cultivation was restricted to Chhindwara district which has now extended in Betul, Hoshangabad, Mandsaur, Neemach, Ujjain, Bhopal, Vidisha, Harda, Shajapur, Agar Malwa, Khandwa, Khargone, Dhar and Ratlam districts. Out of 55,640 ha under orange cultivation Chhindwara commands approximately 25,000 ha only indicating a good potential for orange cultivation in other districts of the state. Pandhurna and Sausar block of Chhindwara district adjoining to Vidarbha region of Maharashtra are famous for quality Nagpur mandarin. Orange cultivation is also becoming popular in two more blocks viz., Mohkhed and Bichhua of the district commanding approx. 1,000 ha each.

The main citrus fruits in Madhya Pradesh are orange, acid lime and sweet orange. As per official record of State Deptt. of Horticulture and Farm Forestry for 2012-13, citrus fruits are grown in 49 out of 51 districts of Madhya Pradesh. The area under oranges in Madhya Pradesh is 52490 ha with the production of 894430 MT.



9. Field Experimental Details:

Treatments:

No. of treatments: Six "Pearl of Sea" (Physio Activators)

- First application : Pre-bloom to early bloom
- Second application : Full bloom/15 days
- Third application : 15 DAT after 2nd application

T₁: Control

T₂: 0.75 ml / lt of water

T₃: 1.0 ml/ lt of water

T₄: 1.25 ml / lt of water

T₅: 1.50 ml/ lt of water

T₆: 2.00 ml/ lt of water

Date of First application Pre-bloom to early bloom : 15 Oct. 2017

Second application Full bloom/15 days : 30 Oct. 2017

Third application 15 DAT after 2nd application : 15 Jan. 2018

Design : RBD

Replication : Three

Plant to plant spacing : 6m x 6m

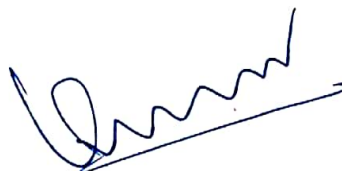
Row to row spacing : 6m x 6m

Field preparation:

The field was prepared with two ploughings and a harrowing so as to make the soil well pulverized and free from weeds. The field was laid out for the trial as per given in plan of layout after the preparation of the field, the experiment was laid out in Randomized Block Design (RBD) with three replications.

Application of manure and chemical fertilizers:

Recommended dose of fertilizers viz., 600 g N, 200 g P₂O₅, 100 g K₂O per plant were applied to the crop. Half of nitrogen i.e., 300 g/plant and full dose of P₂O₅ and K₂O were applied at the time before flowering and remaining 1/3 (300g per plant) quantity of nitrogen was applied in two split i.e. 150 DAF.



Irrigation:

Heavy flood irrigation was applied just before flowering and subsequent irrigation was given at interval of 10-12 days depending upon the soil condition.

Weeding:

In order to control the weeds and avoid competition between plants and weeds, two hand weeding were also done by manual labour, at 30 and 60 days after flowering.

Result Achieved:

A product testing trial was carried out to know the bio-efficacy of Pearl of Sea (different doses) on productivity and their attributes and different observations were recorded for the parameters viz. Diameter of the trunk, number of cluster/tree, number of flowers / branches, number of fruit/branches, fruit yield/ plant, fruit yield/ ha.

Diameter of the trunk:

Data presented in the table-1 revealed that the highest trunk diameter of 9.90 cm was recorded for the treatment Pearl of Sea_{T4} 1.25 ml / lt of water which was significantly maximum over rest of the treatment followed by the treatment T₅ (9.200 cm) and T₃ (8.550 cm) where as minimum diameter of trunk was recorded for the control T₁ (7.213 cm)

Number of cluster/tree:

Result (table-1) indicated that all treatment differed significantly for number of clusters/tree and maximum number of flower cluster/tree was recorded for the treatment T₄ i.e. Pearl of Sea 1.25 ml / lt of water (5.80) which indicated that the concentration enhanced the number of cluster/tree closely followed by Pearl of Sea 1.50. ml / lt of water. On the other hand minimum number of cluster/tree was recorded for the control (4.30).

Number of flowers / branch:

It is evident from the findings that significantly highest number of flowers / branch, were recorded for the treatment T₄ i.e Pearl of Sea 1.25 ml / lt of water (55.32) which indicated that the concentration enhanced the number of followed by T₅ (54.39) and T₃ (51.42). It hand minimum number of flowers / branch, was recorded for the control (40.54).

Number of fruit / branch:

Result indicated that all treatment differed significantly for number of fruit /branch, were recorded for the treatment T₄ i.e Pearl of Sea 1.25 ml / lt of water (15.43) which



indicated that the concentration enhanced the number of followed by T5 (14.78) and T3 (13.60). Minimum number of flowers / branch, was recorded for the control (10.67).

Number of fruits / tree:

Final expression of harvest is expressed by the number which fetches the economic returns. Maximum number of fruits/tree (1050.1) was noted for Pearl of Sea 1.25 ml / lt of water which indicated that the concentration enhanced the number of followed by T5 (980.89) and T3 (910.32). It had lowest number of fruits/ tree, was recorded for the control (430.12).

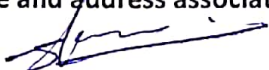
Yield kg per plant:

Result presented in table-1 revealed that product Pearl of Sea increase the fruit yield in all most all the treatment. Significantly highest fruit yield per plant was recorded for treatment T4 (150.33) which were significantly superior over rest of the treatment followed by T5 (141.32) and T3 (134.32). However lesser fruit yield per plant was recorded for control (61.31). The above result shows that Pearl of Sea is beneficial to increase fruit weight and yield at the concentration of 600ml/ha.

Conclusion:

On the basis of aforesaid findings it may be concluded that dose of Pearl of Sea 1.25 ml / lt of water is the best to harvest higher fruit yield (150kg/plant) and it is beneficial to enhance fruit yield attributes i.e. Number of cluster per tree, number of flowers per branches, number of fruit per branches, and fruit yield of Nagpur mandarin.

Name and address associate



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Name and address investigator




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CERTIFICATE

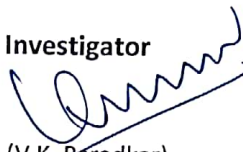
This is to certify that the product testing trial "To evaluate Bio-efficacy and product Impact on flowering and fruit setting rate on Citrus (*Citrus reticulata*)" was conducted at JNKVV, Zonal Agricultural Research Station, Chandangaon,. Chhindwara (M.P.) during 2017-18 under our supervision.

Associate



(Satis Kadwey)

Investigator



(V.K. Paradkar)

Associate Director Research
J.N.K.V.V., ZARS Chhindwara



Director Research Services
J.N. Krishi Vishwa Vidyalaya
Jabalpur (M.P.)

Table NO.1: To evaluate Bio-efficacy of "Pearl of Sea" on flowering and fruit setting rate on Nagpur mandarin (*Citrus reticulata*)

Treatm ent	Diameter of the trunk (cm)	Number of cluster per tree	Number of flower per branch	Number of fruit per branch	Number of fruit per tree	Yield per plant (kg)	Yield /ha (Ton)
	Mean	Mean	Mean	Mean	Mean	Mean	Mean
T ₁	7.2	4.3	40.5	10.6	430.1	61.31	16.98
T ₂	8.1	5.4	49.3	12.1	860.6	124.67	34.53
T ₃	8.5	5.8	51.4	13.6	910.3	134.32	37.20
T ₄	9.9	5.5	55.3	15.4	1050.1	150.53	41.64
T ₅	9.2	4.4	54.3	14.7	980.8	141.32	39.14
T ₆	8.4	3.1	50.0	13.4	920.3	130.41	36.14
SE(m)	0.2	0.2	3.2	3.1	4.0	0.256	0.365
C.D.	0.9	0.6	NS	7.8	8.3	2.154	3.491






Nagpur Mandarin Flower



Nagpur Mandarin Flowering and Fruiting condition

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Table NO.2: METEOROLOGICAL DATA

Year	Month	TEMPERATURE		RF(MM)	HUMIDITY (%)	
		MAXT(C)	MINT(C)		MAXIMUM	MINIMUM
2017	JAN	27.6	10.1	0	76	30
2017	FEB	30.9	12.8	0	60	22
2017	MAR	46.4	18.6	0	55	26
2017	APR	40.7	21.8	0	28	14
2017	MAY	41.3	24.2	3	37	23
2017	JUN	35.0	23.2	128.6	60	47
2017	JUL	28.2	21.3	347.1	86	68
2017	AUG	28.6	21.2	162.9	85	69
2017	SEP	30.0	20.7	171.1	86	75
2017	OCT	29.8	18.1	63	78	55
2017	NOV	29.4	11.7	5	74	34
2017	DEC	28.1	8.5	0	61	35
		33.0	17.7	880.7	66	42
AVG.		27.1	7.0	0.0	61	29
2018	JAN	29.3	10.5	19.2	68	34
2018	FEB	33.9	15.8	0	32	19
2018	MAR	38.6	18.2	0	35	15
2018	APR	41.6	25.4	9.8	33	15
2018	MAY	35.4	22.5	249.6	70	51
TOTAL		35.76	18.48	278.6	47.6	26.8