



## Assessment of Rejuvenation practices in Citrus/Khasi mandarin in Tirap district of Arunachal Pradesh

Abhimanyu Chaturvedi<sup>1#</sup>,  
S.K. Chaturvedi<sup>2</sup>, T.S.  
Mishra<sup>3</sup> and P.P. Tripathi<sup>4</sup>

<sup>1#</sup>SMS (Horticulture), K.V.K.  
Tirap- Deomali, Arunachal  
Pradesh

<sup>2</sup>SMS (Horticulture), K.V.K.  
Lower Subansiri- Yachuli,  
Arunachal Pradesh

<sup>3</sup>SMS (Horticulture), K.V.K.  
West Kameng- Dirang,  
Arunachal Pradesh

<sup>4</sup>SMS (Plant Protection), K.V.K.  
East Kameng- Seppa, Arunachal  
Pradesh



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\*Corresponding Author

**Abhimanyu Chaturvedi\***

### Article History

Received: 7.06.2022

Revised: 17.06.2022

Accepted: 25.06.2022

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### INTRODUCTION

The Khasi mandarin is a major fruit crop in North eastern states of India as well as Arunachal Pradesh. Here East siang, West siang, Namsai, Teju, Lower Subansiri, Tirap Changlang are the major growing districts. The orchards of Khasi mandarin are becoming low productive due to heavy rain, excess humidity, negligence by farmers etc. The attack of diseases and insect are higher than rest part of the country due to humidity. Phytophthora, citrus declining are the major disease observed in Tirap district of Arunachal Pradesh. The table -1 shows that due to all these associated reasons the its productivity is very less 1.90 t/ha as compared national (9.78 t/ha).

**Table-1. Citrus area, production & productivity/ha**

States	Area (,000 ha)	Production (,000 tonnes)	Productivity (t/ha)
Arunachal Pradesh	20.8	25.7	1.90
Assam	14.4	114.9	8.2
Manipur	2.2	9	4.1
Meghalaya	7.3	32.9	4.5
Mizorum	8.8	33.5	3.9
Nagaland	1.4	5.3	3.8
Sikkim	6.8	6	1.13
Tripura	12.7	44.5	3.5
India	1.07 Million ha	10.48 million t	<b>9.78</b>

### Major Constraints-

**Heavy rain fall-** Long time heavy rainfall damages during flowering & fruit development. Also favors to fungus, insects-pests, algae, lichens etc.

**Acidic soils and no amendment use-** Being heavy rain area and forest area, the soil property is acidic in nature. No alkali materials like lime etc. uses by farmers for improvement.

**Nutrient deficiency-** Due to heavy rainfall most of the nutrients wash out from soil. Phosphorus, nitrogen, Calcium, Zinc, boron etc are deficit in their soil.

**Soil erosion-** This problem is related with heavy rainfall. The region is sloppy so during heavy rainfall soil erosion often happens which also wash out soil nutrients.

**Unavailability of quality planting materials-** This is a major issue. The state is hilly, no authentic nursery available.

**Pest & disease problem** – Due to heavy humidity and rainfall different insect-pests e.g. trunk borer, shoot borer, leaf minor, bark eating caterpillar, aphids, leaf minors etc attacks’

So many disease like- phytophthora, bark cracking issue, leaf green, citrus die back etc are the major diseases.

**Marketing problems-** Due to lack of organized market in the sate farmers.

### Strategies-

**Availability of good quality planting material-** This is the key point for better production of orange. The govt. should be supply disease and insect free planting materials to orange growers.

**Proper method of planting-** The planting should be done according to topography. In plane area, square planting system is suitable but in sloppy places; where slope is >25%, the planting should be done on contours grades/half terrace/bench terrace to prevent soil erosion.

**Proper orchard management-** The orange orchards should be managed properly. The weed management, fertilizer application, watering during dry spells, drainage during heavy rain falls, applies of fungicide and insecticides etc should be follow time.

### Pest & Disease management-

#### Disease

Powdery mildey

Gummosis

Citrus canker

Tristeza

Citrus greening

Phytophthora

#### Insect

Trunk borer

Citrus psylla

Leaf minor

Scale insects

#### Control measures

Pruning of dead twigs, spray of sulfex (2 g/l)

Scrapping of affected area, spray of cardendazim (2g/l)

Cutting of infected branch/shoots, spray of cardendazim (2g/l)

Aphid control, uses of certified planting material

control of insect vector, use of certified planting material

Spray of Mancozeb (2g/ l)

#### Control measures

Insecting monocrotophos in holes and spray (0.05 %)

Spraying of monocrotophos (0.05%)

Spray of phosphomion (1ml/ l)

Malathion (0.1%)

After observing all problems, the Krishi Vigyan Kendra Tirap- Deomali decided to conduct On Farm Trial (O.F.T.) in Rabi season, 2015 at 3 locations e.g. Pollung (02 trials) and Nutan Kheti (01 trial). Beforestarting the O.F.T., farmers were trained about scientific aspects of rejuvenation practices in Khasi mandarin. The total four (04) treatments were applied – control (without pruing), pruning from 0.5 m, pruning from 1 m and pruning from 1.5 m.

The pruning started during 2<sup>nd</sup> week of January, 2016. The five plants were/treatments were treated. Except the control treatment, all

diseased, unwanted, declining shoots were cut by secateurs and immediately the pest of Cardendazim fundicide was applied to prevent any other fungus attack. This is very important practice in rejuvenation of citrus because after removal of extra shoots, plant receives proper solar energy which utilizes in photosynthesis resulting in adequate amount of carbohydrate availability to the plant.

The insects like different types of bores-trunk borer, shoot borer etc are lethal for Khasi mandarin. To avoid, the trunk smearing (upto 1 meter from ground level) followed during last week of February. 1 litre

monocrotophos insecticide and 10 kg agricultural lime was dissolved properly in 100 litre of water and this solution used for smearing. By this practice, trunk borer unable to reach in/around trunk because the female insects laid egg during February months.

The farmers are neglects to supply nutrients in orange gardens. But due the continuous efforts of K.V.K. Tirap, now some farmers became aware and those are applying. As per scientific recommendation, the nutrients supply should be done 2 times in a year: March –April & October- November. The urea 0.80 Kg + SSP

1.5 kg + MOP 0.4 kg were supplied 2 times in basin. And agricultural lime 2 kg/plant also supplied with fertilizers, because acidic nature of soil. In the result of proper nutrients availability, the citrus trees grow well. Proper branching, fruiting and fruit development were recorded. To fruit drop control, 10 ppm solution of NAA sprayed during pea size of fruit. That result the maximum fruit retention; resulted in good yield.

The mancozeb fungicide were sprayed @2 gm/litre water during January, May & June months to avoid fungal growth.



Field visit and advice to farmers



Rejuvenation process

Table -2. Result of rejuvenation

Treatments	Plant height (m)	No of branches	Canopy spread (cm)	Yield/plant (kg)
Control (without pruning)	6.13	12	410 x 439	18.54
1 m	3.44	5	166 x 187	9.62
1.5 m	4.16	6	208 x 226	12.89
Primary branches pruned	5.82	8	276 x 272	32.78

The data from table -2 showed that the last treatment- primary branches pruned recorded maximum yield/plant (32.78 kg) produced followed by control. So, this on farm Trials

proved their importance for improving the productivity of Khasi mandarin in Tirap district of Arunachal Pradesh for farmers economic upliftment.