PINEAPPLE CULTIVATION IN TRIPURA

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TRIPURA
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Introduction

Pineapple (Ananas comosus) is one of the commercial fruit crops of India belong to family bromeliaceae. The beauty and virtue of this “Golden Queen” have been extolled by many poets all over the globe. The name of the genus, Ananas, is derived from the Tupi-Gurani Indian word “Nana” in whose country Pineapple has apparently originated. It is generally believed and accepted that the present day cultivated pineapple originated from Paraguay, tropical America. Thailand recorded highest pineapple production while India ranks fourth. Pineapple is a good source of vitamin A and vitamin C and is fairly rich in vitamin B₁ and B₂. It contains enzyme bromelin and several odorous lactone have also been found in pineapple. The fruit contains 85.0% moisture, 13% sugar, 0.6% protein and 0.05% mineral matter. Pineapple is a natural crop and it is the most important fruit crops under prevailing agro-ecological condition of Tripura. Since it is high rainfall area enriched with tilla land favouring the soil erosion. Therefore play a vital role to check soil erosion and it can stand even with minimum care of orchard.

Soil and Climate

Laterite soils on hill tops or medium to heavy loams, rich in humus, low calcium and having a slightly acidic reaction with a pH of 5.0 - 6.0 are best for pineapple. It is a typical humid tropical fruit plant, It require running shade for quality fruits. The fruit grows well near the sea coast or in the interior, so long as the temperature are not at the extremes. The optimum temperature range for successful cultivation of pineapple is between 15.6 to 32.2°C, with high humidity. The agro-climatic condition prevailing in Tripura is ideal for Pineapple cultivation. A large number of varieties are grown in different parts of North-East India. The Important varieties are Giant Kew, Queen, Mauritius Jaldhup, Lakhat and Baruipur local.

Varieties

Cayenne group: Smooth Cayenne, Hilo, Kew and Giant kew.
Queen group: Common queen, Mauritius and Ripley queen.
Spanish group: Red Spanish, Singapore and Masmerah.
Indigenous Group: Jaldhup, Lakhat, Baruipur Local and Haricharanvita

Kew

The plants are vigorous and leaves are long with straight margins. The upper surface is dark green with a superficial brownish-red mottling and the lower surface is silvery Grey or ash- Grey in colour. Leaves often have a short sector of small spines at the tip and also at the base, near its attachment to the stem, where they are irregularly arranged.
Fruits weight 1.5-2.5kg, and is oblong in shape, slightly tapering towards the crown. Eyes are broad and shallow, making fruits more suitable for canning. The fruit is yellow when fully ripe and flesh is light yellow almost fibreless, and very juicy with 0.6-1.2% acid, and its total soluble solid content varies from 12 to 16 brix.
Queen
It is most popular and excellent cultivar of Tripura for fresh consumption. The plants are dwarf in stature and compact, habit of growth and bluish green foliage. The leaves are short stiff, spiny along the margins, and thickly covered with a whitish bloom on both surfaces. Fruit weighs 0.8-1.3 kg. Peduncle is short, fruitlets or eyes are small, prominent, deep set. When fully mature, the fruit is golden yellow and internal flesh is deep golden yellow. The flesh, although less juicy than cayenne, is crisp (less fibrous), transparent with a pleasant aroma and flavour. The total soluble solids content varies from 13 to 17.2 brix and acidity varied 0.6 - 0.8%. The slips are 1 - 4, suckers 1 - 3 and both are smaller in size than those of cayenne.

Mauritius
The fruits are of medium size and are of two types, deep yellow and red. Fruits of yellow oblong, fibrous and medium sweet compared to red type. It is exclusively grown for table purpose. Leaves are yellowish green, spiny throughout the margin. The crown is also spiny in both the types of fruits.

Propagation
Pineapple is commercially propagated by suckers in Tripura. The suckers arise and grow from buds below the ground level. The slips arise from fruit stalks. They are smaller than suckers but borne more in number per plant than suckers. The crown grows on the top of the fruit. It is the vegetative growth at the top of the fruit, attached to the central core of the fruit. Fruit stalks cut into bits known as discs can also be used for propagation.

Planting
The land should be thoroughly ploughed and pulverized to a good tilth. Pineapple is mainly planted just at the onset or at the onset of monsoon in order to avoid heavy precipitation in the pre-establishment period of the plants. Before planting, the suckers or slips should be sun cured and dry leaf scales at the base should be removed and basal ends dipped in monocrotophos (0.15%) and carbendazim (0.1%) to avoid mealy bugs and fungal infection, respectively. Suckers should be planted in 10-cm deep holes, but the heart of the suckers must not be buried. Planting may be done in single row or double rows following triangular and rectangular system. The following is the spacing required for different plant populations per hectare.

<table>
<thead>
<tr>
<th>Plant Population per hectare</th>
<th>Distance Plant to plant within a row (cm)</th>
<th>Distance Row to Row (cm)</th>
<th>Distance Trench-Trench (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>43,500</td>
<td>30</td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>53,300</td>
<td>25</td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>63,700</td>
<td>22.5</td>
<td>60 or 45</td>
<td>75 or 90</td>
</tr>
</tbody>
</table>
The rate of ratooning was compared in traditional and high-density planting of 55,555 plant/ha. In this way two successive ratoon crops harvested at 12 monthly interval amounted to 54.5 and 57.6% of the plant crop yield. The yield of the first and second ratoon crops is to an extent of 50 - 60% and 40% of the plant-crop in Tripura. High-density planting, besides increasing the yield, is associated with other advantages like less weed infestation, protection to fruits from sunburn and increased production of suckers and slips per unit area, and non-lodging of plants. Close planting also cuts down the cost of providing shade to fruits, as it provides natural shade through upright orientation of the apical leaves and eventually results in uniformly coloured lustrous fruits. In Tripura about 15-20 % of fruits develop sunburn in the absence of adequate shade. High-density planting also results in overlapping of basal leaves forming a sort of natural covering over the soil, preventing evaporation losses and thereby resulting in moisture conservation. Under dense planting a microclimate with high humidity will be created around the plant which is congenial for growth and fruiting. It is also possible to take at least 2 ratoon crops under high-density planting. High density planting is recommended to accommodate as many numbers of plants as possible while ensuring sufficient space to carry-out cultural operations.

**Manuring**

Pineapple plants should be fertilized with 600 kg N, 400 kg P₂O₅ and 600kg K₂O with 25 - 30 tones FYM per ha. under dense planting. Application of fertilizers in three split doses, once at the onset of monsoon (June-July) and again at the end of rainy season (September-October) third one is (February- March) although it varies with varieties. After the fruits are harvested and slips and suckers are removed the application of fertilizer have been found effective to promote growth and yield.

**Water Management**

Pineapple is grown mostly as a rainfed crop in Tripura. Although, region receive a heavy rainfall. However, irrigation is necessary during dry spell, especially November to March at 20-25 days interval ensure good crop. The off season production is not impossible with out 4-6 irrigation in dry hot months. Since stomata of Pineapple leaves never open during sunlight due to xerophytic nature of plants. The roots are very sensitive to water logging. Therefore, tilla land is most suitable due to good drainage.

**Weed Management**

Successful weed control is very important in pineapple growing. Especially during the rainy season weed poses a serious problem and manual weeding accounts for 40 % of the total production cost. Although manual weeding is common in pineapple culture in India chemicals have proved to be effective in controlling weeds in pineapple plantations and bringing down the cost of weeding effectively. Diuron @ 2.5-5kg/ha. seemed to be successful in controlling weeds. Due to long rainy season (April- October,) weedcide/herbicide are not so effective in slope pineapple orchard of
Tripura. High density planting is a better option to reduce the density of weed and problem as well.

**Flowering and Fruiting**

Pineapple plant generally flowers after the attainment of certain vegetative growth and ripeness to flower stage is attained 11 - 12 months after planting and formation of at least 36 leaves. It is often observed that even after 15 - 18 months of growth under optimal nutritional and environmental conditions only 50-60% plants come to flowering. Therefore it would be advisable to use following growth regulators for different months for inducing flowering.

**September - January**
- NAA 20ppm (Planofix 2ml/4.5litres of water) +2% urea

**March - May**
- Ethrel 10 PPM +2% urea + 0.04% sodium carbonate

**All months**
- Ethrel 25 PPM +2% urea + 0.04% sodium carbonate.

**Tips for year round production & improvement of Fruit quality**

- Taking up pineapple planting at regular (From September to March at one-month interval, especially Queen variety) under agro climatic condition of Tripura.
- Planting of different grade of Suckers (300g, 600g, 900g and above) in the month of October produced flowering & fruiting at different time.
- Using suckers, slips and crown of different sizes as planting material to get prolonged harvest.
- Diversification of varieties, Queen normally mature in the month of April, May and June, whereas Kew mature during July, August and September. Planting of two to three varieties in an orchard produced the fruits at least six months of a year.
- For harvesting the fruits throughout the year, slips or suckers of pineapple should be planted from July to December, followed by application of etherel (0.25ml/l) or calcium carbide (20g/l), between 335 and 365 days after planting.
- Flower inducing chemicals should be applied to the heart of the plant between 5.00 to 6.00p.m. In evening and only when plants have at least 32 leaves. The flower emergence will come out after 55-60 days of chemical spraying.
- Application of chemicals at an interval of 7 days from April to November can ensure steady harvest of the fruits throughout the year, if plant have at least 32 leaves at the time chemical spraying.
- Slips should be removed immediate after emergence, if number of slips will increase then fruit size and quality will decreases.
- Encourage the growth of suckers as it have a positive impact over fruit quality and size.
- Pinching- Removal of the innermost whorl of leaflets along with the growing tips after 40 days of flowering was found best to get better fruit shape and size. It enhances the fruit size and weight up to 15 -20% in compared to non-pinched.
Insect pests and disease management

Pests
Mealy bug is the damaging pest particularly to smooth cayenne cultivar. The rapid spread of this malady in the field is largely due to the feeding habit of the bug. The most prominent symptom is obvious wilting of the leaves, commencing at the leaf tips accompanied by reddish yellow colour developing in the wilting areas of the leaves. The most resistant varieties and species of pineapple to mealy-bug wilt are Red Spanish and Queen. For controlling of these bugs at the time of planting basal brownish leaves of the cured planting materials should be removed. Basal portion of the planting materials needs to be dipped in 0.02% to 0.04% methyl parathion as a prophylactic measure. Although mealybug is not a major pest of pineapple orchard of Tripura.

Diseases
Leaf rot/base rot /foot rot are caused by Ceratostomella paradoxa cause rotting in planting material, fruits, plant stems and leaves under high moisture and humidity. These can be controlled by dipping plant material in 0.3% Dithane Z-78 or by spraying on leaves. Black rot and soft rot occurs in ripe fruits mostly after harvest. Dipping of fruits for 5min in thiabendazole 1000ppm or benomyl 3000ppm would minimize rotting.

Harvesting and Yield
Generally pineapple flowers 10-11 months after planting and in Tripura fruits attain maturity after 3-4 month of flowering, varied with the variety, time of planting, size of planting materials. The most common index of harvesting of pineapple is yellowing of ½ basal of the fruit for local market. The yield from a plant population of 35000-40000 /ha. is about 40-50 tones and that from a plant population of 43000-50000/ha. normally varies between 50-60 tones.