



FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

Botanical name	: <i>Ananas comosus/ syn. Ananas sativus</i>
Family	: Bromeliaceae
Chromosome Number	: 2n = 28/30

- Pineapple is considered as one of the most popular tropical fruit, and is known as “Golden Queen” all over the globe.
- It can be grown as mixed crop in most of the orchards and also as hedge plant and as a pure crop.
- It is drought tolerant and suitable for marginal lands.

Composition and Uses

Pineapple has been described as an excellent source of vitamin c and also good source of vit -A and B, Sugar 13 per cent, Acidity-0.6-1.0 per cent mineral matter-0.05 per cent, Fiber, 0.3 per cent, Ca, Fe, P. The fruit contains a protein digestive enzyme Bromelin.

- Fruits are relished as dessert in the form of slices either fresh or canned, preparation of juice, squash and jam and mixed jam. Candy is prepared from fruit core.
- Fruits are used in preparation of alcohol, vinegar, calcium citrate, citric acid, gum and pineapple flavors.
- The leaves yield silky fiber which is used for making a fine fabric known as Pina cloth in Philippines and Taiwan.
- The pineapple plants and the fruit residues after extraction of juice are used as cattle feed.

Origin and Distribution

- It is believed to have originated from North Brazil from where it spread to other tropical parts of the world.
- The major pineapple growing countries are Tropical America, Mexico, Malaysia, Kenya, Taiwan, Australia, Srilanka, Singapore and India.
- Its cultivation is confined to high rainfall and humid coastal regions in peninsular India and to the hilly areas of North-Eastern region of the country.
- The important states are Karnataka, West Bengal, Maharastra, Tamil Nadu, Assam, Manipur, Meghalaya, Tripura, Andhra Pradesh and Orissa.

Climate and Soil

- Pineapple can be grown successfully from seacoast to an altitude of about 1500m above sea level.
- The optimum temperature is from 21⁰C-24⁰C.
- It can be grown in areas of 22⁰C-32⁰C with optimum rainfall ranges from 100-150 cm.

- The higher temperature is beneficial for fruit development, low temperature is harmful and does not improve colour of fruits.
- The fruits grow well in sandy loam soil.
- Fruit size is larger on the heavier soil but flavor of the fruit is better when grown on lighter soil.
- It prefers soils which are acidic (pH 4.5-5.5). while high Mg and Mn content are injurious to the crop.

Species and Cultivars

Smith (1979) established two genera, Ananas and Pseudananas, Pseudananas at maturity bears a minute inconspicuous coma of bracts and plants produce elongated stolons and no slips, where as Ananas bears conspicuous coma of foliaceous bracts and plant produce slips but not stolons and fruits remains seedless. The genus Ananas has 8 species viz.,

<i>Ananas comosus</i>	The cultivated species with large fruits and a short thick spike	
<i>A. monstrosus</i>	Crownless- There is no leaf formation on fruit	
<i>A. bracteatus</i>	has well developed, bright red flower bracts. Fruit is edible and relatively large.	
<i>A. fruitzmuelleri</i>	It bears pale green, developed bracts.	
<i>A. ananassoides</i>	With small fruits, erect leaves and a long fairly thin spike	
<i>A. nanus</i>	A dwarf species.	
<i>A. paraguayensis</i>	with curved leaves.	
<i>A. lucidus</i>	It has smooth (Spineless) leaves from which good quality fibre can be obtained.	
Only one species has been listed in Pseudananas- <i>P. sagenarius</i>	<i>Ananas comosus</i>	<i>Ananus bracteatus</i>
<i>Ananus nanus</i>	<i>Ananus lucidus</i>	Spanish group

		Fruits are of 1-2 kg in wt, globose in shape, fibrous, sub acid, spiny, resistant to mealy bugs. Eg: Mauritius Red Spanish, Singapore Spanish, Green Selangor, Castilla, P.R.1-67.
Ananus anansoides	Cayenne group Cylindrical fruits with mild acidic, yellow (Spiny tip) 2-3 kg. flesh sweet, suitable for sweet canning, low fibre. Eg: cayenne, Baron, Rothschild, Smooth Guatemalan, Kew, Giant Kew and Typhone.	Abacaxi group Conical fruits, pale yellow-white flesh, spiny 1.4 kg sweet tender and juicy grown in Brazil. Eg: perola, Abakka, Sugar loaf, Papelon, Venezolana, Amarella.

Maipure Group

Fruits ovoid to cylindrical, sweeter, fibrous 1-2.5kg with yellow flesh, very juicy. Eg: Maipure, Bumuguesa, Rondon, Perolera, monte lirio.

The cultivars grown commercially in India are Kew, Giant kew, Queen, Mauritius. Some of the indigenous cultivars - Jhaldheep (Sweet type) & Bakhat (Assam)-Sour Lakhat (Nagaland) and Barupur local (West Bengal).

Propagation

- Pineapple is mainly propagated by vegetative methods viz., suckers, slips, crowns and stumps, among these suckers and slips and crowns are the three important parts used as planting. The suckers arise from the axils of the leaves below the ground level and come to flowering early (15-18 months) and the slips formed on the fruit stalk below the fruit are usually preferred for planting (15-18 months and 20-22 months after planting respectively, than the crowns (24 months). About 250-500 gm of suckers 250-450g slips and 40-45cm crowns are selected for planting. In some localities, butts-the stems of the plants already flowered, which are trimmed of roots, leaves and the peduncle are also used.
- The planting materials should be treated with mercurial fungicide. The planting materials should not be stored more than 14 days; Suckers production can be enhanced by giving additional Nitrogenous fertilizers and more water, in recent years micro propagated plants are also available.

Planting

- **Planting** is done during kharif season, before **planting** suckers or slips should be sun-dried, dry leaves and scales at the base should be removed basal end of **planting** materials should be dipped in 0.4 per cent difolton and 0.05 per cent ekalux to avoid fungal & mealy bugs infestation. The suckers or slips are planted in 10-15cm deep holes, while **planting**, the growing part should not be buried. **Planting** may be done in single or double row systems.
- In single row system we can accommodate about 15,000 -20,000 plants/ha – yields about 20t/ha
- In double row system (25x35x90cm) High Density **Planting** (HDP) is adopted in almost all pineapple growing region of India, we can accommodate about 64000 plants and gives about 100-120t/ha of fruit yield.

Nutritional Management

Manuring

- About 30 tonnes of FYM/ha/year, along with 500:140:560 kg NPK/hectare for 42,000 plants/ha whereas 600:200:600 kg NPK for 64000 pl/ha.
- Fertilizers should be applied at 3 months after **planting** in 4 split intervals. Foliar application of N (2-4%) is practiced.

Micronutrients deficiency

- Iron, Zinc and copper deficiency are common in pineapple, the deficiencies can be corrected by spraying FeSo₄ (3 per cent), Zn So₄ (1 per cent) as foliar spray.
- Copper deficiency can be corrected by drenching CuSO₄ (1.5-2 per cent) at 30-50 ml per plant.

Irrigation and Weed control

Irrigation: Though, pineapple is a rainfed crop, 4-6 irrigations may be necessary during dry season at 20-25 days interval.

Weed control: combination spray of Bromocil and Diuron @ 2kg a.i/ha as pre-emergent herbicides can control weeds efficiently.

Flowering and Weed control

- A pineapple plant generally attains **flowering** stage 11-12 months after **planting** by which time the plant should have produced atleast 40 leaves.
- Irregular **flowering** behavior is one of its major drawback.
- **Flowering** is not uniform in pineapple, to induce good and uniform **flowering** the following measures are to be taken, spraying of NAA 100-200 ppm ie.
- Pouring of 50 ml solution in to the center (heart) of plant to induce good **flowering**. Also, ethrel at 25ppm combining with Urea (2%) and sodium carbonate (0.04%) to induce good **flowering**.
- These application has to be done, when the plants have 35-40 functional leaves and a clear sunny days (one year old plants).

- Staggered **planting** to get fruits throughout the year, the plants generally give out the inflorescence in 12-13 months after **planting** (Feb-April).
- Fruit takes 41/2-51/2 months from set to harvest (June –Aug).

Harvesting and Yield

Harvesting

- At maturity with a slight colour change at the base of fruit.
- The lowest eyelets have orange yellow colour and flattened. The bracts become loose & brown.
- The fruits should be harvested along with 5-7 cm stalk on full maturity because it is non-climacteric fruit

Yield

- The yield from a plant population of 350000-400000 per hectare is about 40-50 tonnes and that from a plant population of 43000-50000 per hectare normally varies between 50 and 60 tonnes.

Storage and ripening

Storage: At 10-13°C, the fruits stored for more than 20 days at 10-13°C, do not store at less than 8°C, since it results in browning of pulps.

Ripening: Pre-harvest application of Ethrel at 500 ppm induces uniform ripening and colour development, but fruits will be acidic and lack flavor

Physiological Disorders

Sunscald: The cells under the fruit skin of exposed surface to sunrays get damaged; care should be taken to control lodging and fruit should be covered with dry straw or its own leaves during April- May.

Fasciation and multiple crowns: Multiple crown may occur due to genetical factor as well as due to soil and environmental reasons. It is also due to excess Nitrogen. Fruits get flattened and fasciated. In fertile virgin soil of warm areas, more abnormal fruits occur as compared to less fertile soil.

Black heart: It is also known as endogenous brown spot or internal browning, formation of brown spots at the base of fruitlets and further black discoloration of the centre core. Low temperature or exogenous application of GA3 can induce this disorder. Fruits exposed to high temperature (40°C) for 24 hours reduce black heart in cold stored pineapple.

Pests and Diseases

Pests

- **Mealy bug-** *Dysmicoccus brevipes*- Due to secretions of toxic substances the mealy bugs attract and finally the plant gets wilting. The comparatively resistant **cultivars** and species are Red Spanish, Pernambuco, Queen, *Ananas bracteatus*, *Pseudananas sagenarius*.
- **Ants, Nematodes** also cause some minor damage.

Diseases

Soft rot, Storage rot and Fruit rot- *ceratostomella paradoxa*

- This disease is prevalent in the lower pulney hills of India causing sever loss in region with high rainfall and low temperature.

Heart rot and stem rot - *Phytophthora parasitica*

Leaf spot, Black spot, Sclerotium wilt.

Pineapple wilt virus – transmitted by mealy bugs etc., also causes damage.

Ratoon management – Single sucker/plant with regular package of practices can give normal yield of the crop.