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DEPARTMENTAL NOTE

Mass Production of Pineapple Planting Material

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INTRODUCTION

Demand for local canned pineapples has increased to such an extent that new canneries are established to process more fruits. In spite of this, and the financial assistance given as a subsidy to plant pineapple for diversification of cropping in commercial plantations, and the loans given to small holders, the extent under pineapple has not expanded appreciably.

Spacing trials conducted by the Division of Horticulture, C. A. R. I., Peradeniya, have shown that optimum sized fruits for canning are produced when plant densities range from 13-15,000 plants to the acre (for the variety Kew). An acre of pineapple planted at this density yields 10-15,000 suckers suitable for planting, during the second year, or after the first crop of fruits is harvested. In addition to this, crowns, slips and butts could also be used for planting. It appears that the limiting factor to rapid expansion of the area under pineapple is the planting material.

Studies conducted in Ceylon and in other pineapple growing countries such as Hawaii, Australia and Malaysia show that in addition to the vegetative parts normally used for propagation of pineapple, stems cut into small segments, and single leaf cuttings of crowns subtending axillary buds could also be used to produce plantings.

METHODS OF PROPAGATION

The following methods of propagation tested out by the Division of Horticulture are described below.

A.—*Stem segments* :

(1) Pineapple plants normally produce short stems but at flowering they elongate. Healthy plants were selected after harvest, and their leaves were removed to expose the stems. They were then cut transversely into pieces about one inch thick, dipped in a 1% solution of potassium permanganate and planted in sand beds so that they rested on their flat sides and were fully covered by sand. (See sketch). After 4 weeks the buds on these stem segments started to sprout and the small plants produced were replanted in pots containing a well drained medium rich in organic matter. However, the growth of these plantings was slow and they produced fruits after 30 months.

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Each stem was cut into between 15-24 pieces. Most of the cuttings produced on an average one planting, while some produced as many as five and still others none.

(2) Pineapple plants both before and after stem elongation were selected and cut into segments having 3-5 whorls of leaves. Each of these segments were cut longitudinally into 4 pieces (see sketch.) Some of these segments had all their leaves removed, dipped in a solution of potassium permanganate and planted in sand beds, so that the surface with buds was upwards. The other set of pieces had their leaves trimmed to 4-5 inches in length, and planted upright.

Stem segments with the trimmed leaves produced on the average one vigorous planting, while those without leaves produced weak plantings. The common practice in Hawaii is to multiply a selected clone by planting stem segments with trimmed leaves in nursery boxes and then in the field.

B.—Planting of buds.

Pineapples are harvested with 4-8" of the fruit stalk. The elongated stem which supported the fruit, if allowed to remain produces suckers well above ground level. These suckers produced high up on the stem collapse when they bear fruits, causing heavy losses. To avoid this loss the suckers produced high up on the stems could be removed for use as planting material or the stems could be cut back to 4-6" above ground level soon after harvest. Repeated removal of suckers delay the next harvest and, exhaust the mother plants.

Butts, or segments of stems (see sketch) removed after harvesting the fruits could be used for producing a large number of suckers suitable for planting. For this purpose they are planted in nurseries.

Shallow drains 8 inches wide and 6 inches deep were made in plowed up and harrowed land, spacing them 16-18" apart. The butts were then placed lengthwise along furrows so that they rested end to end. The leaves were pressed down so that they rested between the stems and the edge of the furrow (see sketch). Placement of the leaves enabled the axillary buds to force their way up through the leaf bases and the soil. Removal of leaves deprives the young plants of the food reserves and auxins in the leaves. Cutting or trimming them was cumbersome and expensive.

Stem placed in the furrows were covered with a 2-3 inch thick layer of soil. Deep burial of stems or use of ill-drained soil caused stem rot and resulted in poor sucker production. Between 6-8 weeks after planting the first crop of suckers emerged above the soil. When these suckers were watered fortnightly with a solution containing $\frac{1}{2}$ lb. of urea and $\frac{1}{2}$ oz. cane sugar per gallon of water to wet the suckers thoroughly the growth of plants was very much hastened. Young suckers can be allowed to remain till they are sufficiently grown for planting out in the field or transplanted in a second nursery.

About 25,000 butts could be planted in one acre of nursery. This produces between 100,000—200,000 suckers per acre, giving an average of about 6 suckers per butt. In experimental studies as many as 25 suckers were produced from one butt.

MASS PRODUCTION OF PINEAPPLE PLANTING MATERIAL

C.—Crown Segments

Pineapple crown is a continuation of growth of the vegetative bud, after the flowers are produced. It is a miniature plant with leaves, nodes, internodes and axillary buds. These axillary buds remain inactive and dormant under normal conditions. The Pineapple Research Institute, Hawaii has made use of these axillary crown buds to produce plantlings, by growing them in vermiculate or sand as media. This method was adopted in Ceylon for multiplication of clones selected on the basis of fruit shape, colour, and size. However, it was not considered for commercial production of pineapple plants as these plants take over 24 months to produce fruits even with intensive care and attention.

Crown of mature fruits were taken and their tiny basal scale leaves were removed. Below this layer all the leaves with discernible axillary buds were cut off with the small piece of stem attached to it. This piece of stem was sterilized by dipping in a solution of potassium permanganate, or cerasan, and planted in pots or beds with river sand. When river sand or vermiculate is used sterilization of the leaflet is not essential.

When propagation is done on a field scale, nursery beds 4 feet wide, and of a convenient length could be used for planting crown segments. Sand beds, and beds with 4 inch layers of coir dust or paddy husk covered with a one inch thick layer of sand were also used for planting. These beds were raised above ground level to facilitate drainage, and lined with bricks or off-cut timber.

The beds with mulching material below the layer of sand were at an advantage in that they retained sufficient moisture below the surface while the upper layer of the medium was well drained even during wet weather. A scaffolding made with unwoven coconut leaves provided shade, reduced the beating action of rain drops and excessive dessication during dry weather.

The freshly cut crown segments with leaves were planted in these rooting media, and watered when necessary during dry weather. In 4-6 weeks time the buds began to sprout and in 8-12 weeks the small plantlings were sufficiently developed for transplanting in polythene bags or second nursery beds prepared by incorporating organic matter and sand to facilitate good drainage.

These young plantlings could be made to grow faster by watering with a nutrient solution containing N P K and trace elements. With intensive care and attention these plants could be made ready for planting in about 6 months. On an average 20 plantlings could be produced from a crown, when the crowns are cut by experienced workmen.

STEM SEGMENTS

