

# Effect of Nitrogen, Borax and Sulphur on Yield of Paclobutrazol Treated *Carica papaya* L. Fruits

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**Abstract:-**The cultivation of papaya was carried out in the farm of Kawhmu Township, Yangon Region from using the seeds of papaya. The cultivated papaya was treated with the different fertilizer ratio of Nitrogen, Borax and Sulphur. Seven treatments with five replicates were treated with fed to the plants. The result of the experiment showed that the highest fruit yield (205 number) was obtained from T3 (N 20g + B 30g) than other levels and if possessed medium fruit weight (830 g). Even T3 had the highest yield, its fruit characteristic of T3 (N 20g + B 30g) were medium.

**Keywords:-** Fertilizer Ratio; Treatments; Fruit Yield.

## I. INTRODUCTION

The papaya (*Carica papaya* L.) is the most economically important fruit in the Caricaceae Family. Its fruits, available through the year are very common food items in local markets [4]. Sixty percent of the Papaya fruit is edible. The latter is an excellent source of vitamin C (ascorbic acid) a slice of which can meet on adult's daily requirement of 70 to 75 mg Vitamin C [5]. Papaya is a tropical plant and prefers warm areas with abundant rainfall or irrigation [2]. Rough handling results in bruises and sometimes internal damage which lower market quality [5]. In the tropics and under suitable growing conditions, ripe fruits can be harvested in about 10 to 12 months after planting [3]. In subtropical areas, it may take a little longer to produce ripe fruits. The fruit is highly perishable and should be handled carefully to prevent postharvest losses [2].

- To observe the effect of PBZ on vegetative growth and reproductive growth of papaya.
- To evaluate the different concentrations of inorganic fertilizer on yield of papaya.

## II. MATERIALS AND METHODS

### ➤ Time and place of the study

The cultivation of papaya was carried out in the farm of Kawhmu Township, Yangon Region from September, 2013 to October, 2014 using the seeds of papaya.

### ➤ Germination of papaya seed

The planting material, papaya seeds were collected from Myanmar Agriculture Service. The seeds were germinated into the polyethylene bag containing sand, soil and rice husk in a ratio of 2:1:2. One holes 1cm depth were made in the medium. One seed was sown in a hole of a

bag. The polyethylene bags were kept under nursery house to protect the seedling from direct exposure of strong sunlight and wind.

### ➤ Soil Analysis

The soil from the experimental area at the depth of 30 cm were collected and analyzed in the soil laboratory, Land use Division, Myanmar Agriculture Service, Yangon Region for soil analysis.

### ➤ Land preparation for cultivation of papaya

The soil from cultivation field was thoroughly crushed and sieved to remove hard soil balls, stones and garb-ages. The hole in the depth of 45cm was dug and mixed with 10g humus, 20 g Trigonol Fungicide and 2 g of Forwarfuran pesticide. Then the seed was sown in the prepared bag containing soil medium. Thirty days after germination, the seedlings of papaya from the nursery were transplanted to prepared field.

### ➤ Experimental layout

The total of 35 plants were cultivated in the prepared soil. The spaces between plants were 90cm and between rows were 60 cm. The total area of this experiment was 1230 cm×750 cm. There were 7 treatments with 5 replicates each. The treatments are randomly assigned in each block. The control plot has not been treated with inorganic fertilizer.

### ➤ Cultural management practices

The plants were watered in three days. Weeding and pesticide application was done whenever it was necessary. The different treatments of inorganic fertilizers were applied in every month.

### ➤ Harvest and handling process

Papayas are normally harvested 9 to 10 months after transplanting. Fruit should be harvested when skin color changes from dark green to light green and yellow streak being developed from the base of the fruit. Fruit in this condition will continue to ripen normally after harvest. The fruits must be handled with great care to avoid scratching and leaking of latex which stains the fruit skin. When harvesting by hand or with knives, the peduncle is snapped off or cut out from the tree, then the fruit was placed upside down position to release the latex properly and not the fruit burn from the exuded latex.

➤ *Data collection and statistical analysis*

The data was collected in every month. The vegetative characters such as plant height, canopy diameter, number of node, stem circumference, number of leaf, number of floral bud, number of flower, marketable and non-marketable fruits per treatments were collected from each treatment. The Mean separation was done by Least Significant Different (LSD) (Gomez and Gomez, 1984). The data were analyzed using the IRRISTAT software, version 4, developed by International Rice Research Institute (IRRI), the Philippines.

**III. RESULTS**

**A. Plant Height**

The height of papaya was characterized by an early period when the increased height was quite slow. Then comes a period of rapid increase in height, followed by another period of ceased in growth. The statistical results of plant height between treatments were not significant. But at 120 DAT, the treatments were significant at 0.05 % level. Similarly, the mean plant heights of treatments were not significant. Among treatments, the tallest plant height (51.17 cm) was observed in N20+B30 kg ha-1 treatment and the shortest height in control (34.16 cm) (Figure 1).

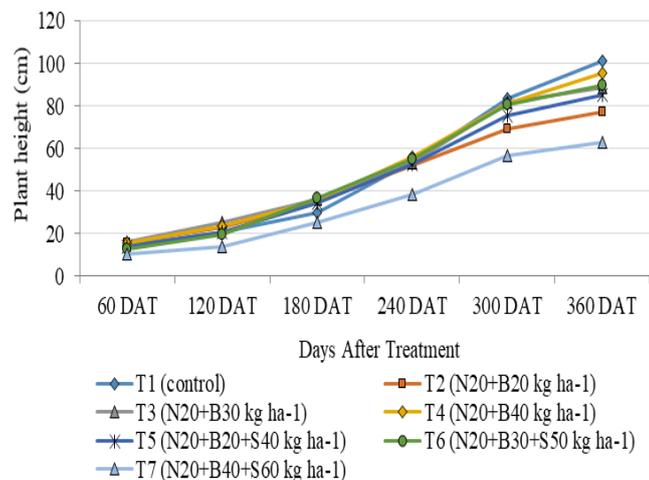


Fig 1:- Total, marketable and non-marketable fruit yield of papaya resulted from different levels of nitrogen, borax and sulphur treatments

**B. Number of leaves**

The statistical results of leaves number between treatments were not significant each other. Similarly, the mean leaves numbers of treatments were not significant. Among treatments, the highest leaves number (34.40) was observed in N20+B30 kg ha-1 treatment and the lowest leaves number in control (26.95) (Figure 2).

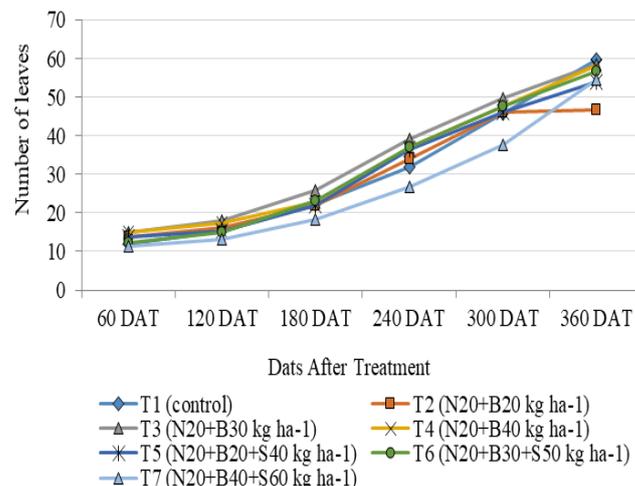


Fig 2:- Leave number of papaya resulted from different levels of nitrogen, borax and sulphur treatments

**C. Floral Bud Number**

The statistical results of floral bud number between treatments were not significant each other. Similarly, the mean floral bud numbers of treatments were not significant. Among treatments, the highest floral bud number (51.17) was observed in N20+B30 kg ha-1 treatment and the lowest floral bud number in control (13.53) (Figure 3).

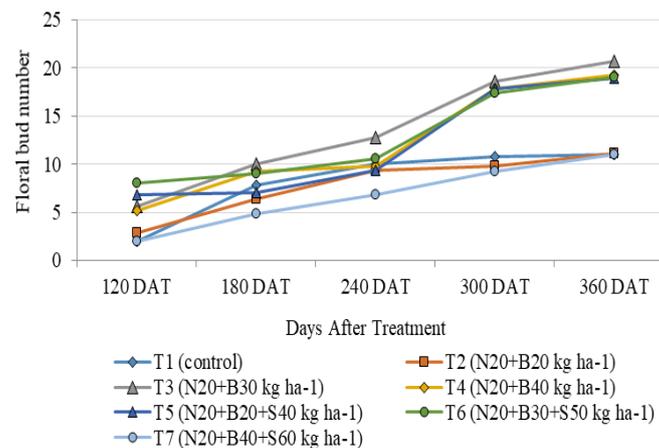


Fig 3:- Floral bud number of papaya resulted from different levels of nitrogen, borax and sulphur treatments

**D. Number of flower**

The statistical results of flower number between treatments were not significant each other. Similarly, the mean flower numbers of treatments were not significant. Among treatments, the highest flower number (14.61) was observed in N20+B30 kg ha-1 treatment and the lowest flower number in control (8.68) (Figure 4).

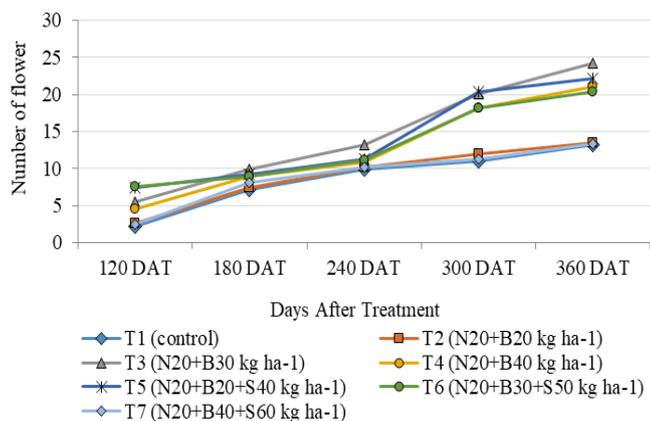


Fig 4:- Flower number of papaya resulted from different levels of nitrogen, borax and sulphur treatments

**E. Total, marketable and non-marketable fruit yield of papaya treated with different level of nitrogen, borax and sulphur treatments**

Mean marketable yield and non-marketable yield from different level of nitrogen, borax and sulphur treatments per plant were statistically highly significant at 0.01 % level. But total yield was statistically significant at 0.05 % level. Among treatments, N20+B30 kg ha-1 produced the highest total fruit yield 41.11 number and lowest total fruit yield control 23.59 number. The highest marketable fruit yield 33.06 number and 11.63 number of non-marketable fruit yield were also obtained from N20+B30 kg ha-1. The lowest marketable fruit yield resulted from control 14.89 number and non-marketable fruit yield 11.30 number (Figure 5).

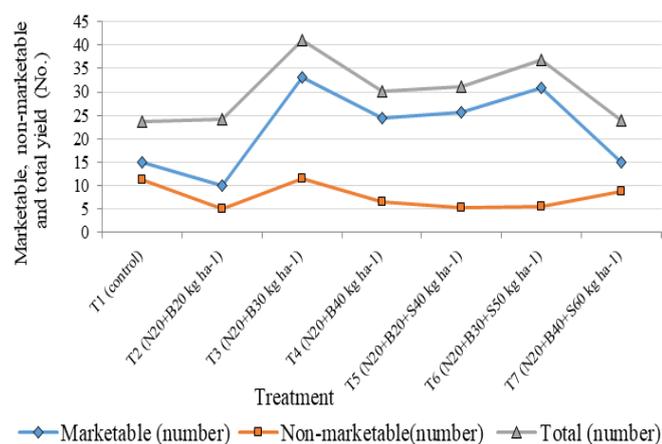


Fig 5:- Plant heights of papaya resulted from different levels of nitrogen, borax and sulphur treatments

**IV. DISCUSSION AND CONCLUSION**

Papaya were treated with different levels of nitrogen, borax and sulphur as well as their combination for yield improvement. Total of seven treatments such as control, N20+B20 kg ha-1, N20+B30 kg ha-1, N20+B40 kg ha-1, N20+B20+S40 kg ha-1, N20+B30+S50 kg ha-1 and N20+B40+S60 kg ha-1 were carried out on the growing of papaya plants to produce high vegetative growth and total fruit yield of growing period in field. The results of vegetative growth showed that the application of N20+B30

kg ha-1 on the papaya plants attained the superior stem circumference, number of nodes and canopy diameter. However, the medium plant height and second highest number of leaves were obtained from N20+B30 kg ha-1. The results of the reproductive growth of experiment showed that the maximum of floral bud number, flower number and marketable and non-marketable fruits per treatments were also obtained from N20+B30 kg ha-1. The Philippines recommends of papaya commodity team [5] reported that nitrogen is required in first vegetative period of 5-6 months for the plant growth and high fruit yield. [6] also reported differential sensitivity of papaya cultivars in expression of boron deficiency symptoms. Dry cool climate reduces the uptake of boron from soil thus increasing the incidence of bumpiness in papaya fruits. [1] recommended the various levels of nitrogen application, irrigation levels and boron application effected of on fruit yield and bumpiness. The Philippines recommends for papaya commodity team [5] reported that 20 - 40 g borax per tree is suggested for yield and fruit quality of papaya.

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