



# Chemical Induction of Dwarfism in Coconut

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## Introduction

**P**aclobutrazol-PP333, a synthetic growth retardant is known to restrict the terminal growth in higher plants by blocking the gibberellic acid biosynthesis. This chemical is being used commercially for the restriction of vegetative growth in a number of fruit crops such as apple, strawberry, peach, mango, grapes, etc. without any adverse effect on yield. But, it is not known hitherto, as to how effective Paclobutrazol will be in a monocotyledonous perennial tree crop like coconut with indeterminate growth habit.

When Paclobutrazol (500 ppm as well as 1000 ppm) was sequentially sprayed on coconut seedlings at emergence and one month later, ie, at cotyledonary leaf stage, it was found to have profound effect on the vegetative growth and not on dry matter production. The growth retardation was observed at three months of growth of the seedling itself, with 17% reduction in the height as compared to the control seedlings without any effect on the girth at collar and leaf production. At twelve months of growth, the treated seedlings were dwarf in stature, with 50% reduction in height, 40% reduction in leaf area and 50 to 57% reduction in the average length of the petiole. Other important seedling selection traits like girth at

collar and number of leaves remained almost the same. Total dry weight of the seedling was also not hampered by the Paclobutrazol treatment.

It is known that Paclobutrazol reduces the stem height by reducing the inter nodal length and leaf area. Since, in coconut the stem formation takes place only after 4 to 5 years of growth, the reduction in the length of petiole must be the important contributing factor towards the reduction in height. Since, the number of leaves produced remains unaffected, reduction in leaf expansion can be attributed to the reduction in leaf area.

The growth retarding effect of Paclobutrazol was expressed even at three months of growth of the seedlings and continued up to 12 months. However, this transient effect of



A view of the coconut nursery (at 12 months growth) T- seedlings sprayed with paclobutrazol. C-control seedlings

dwarfism or reduction in seedling height gets dissipated once the seedlings are transplanted in the field. The seedlings transplanted from the nursery in the field, after establishment, showed normal leaf growth and development. The effect of Paclobutrazol on the vegetative growth of coconut seedlings without affecting the dry matter production is in agreement with those observed on a wide variety of fruit crops. Further extensive work is needed for evolving a recommendation for reducing the height of coconut seedlings which may be of help to the coconut farmers.

**Table 1. Effect of Paclobutrazol on the growth of coconut seedlings (12 months after treatment)**

| Treatment | Height (cm) | Girth (cm) | Total leaf No. | Petiole length (cm) | Total LA (sq. cm.) | Shoot dry mass (gm) |
|-----------|-------------|------------|----------------|---------------------|--------------------|---------------------|
| Control   | 105.2       | 10.4       | 5.0            | 29.9                | 2.4                | 47.0                |
| 500 ppm   | 61.9        | 10.3       | 6.0            | 14.5                | 1.6                | 32.5                |
| 1000ppm,  | 57.5        | 10.7       | 5.0            | 12.7                | 1.4                | 37.4                |