# *Influence of Auxin on Fruit Set, Growth and Development in Horticultural Crops*

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**ABSTRACT**

Auxin is an important plant hormone that regulates fruit set, growth and development in horticultural crops. It promotes fruit set by preventing flower and young fruit drop after fertilization. Auxin enhances cell division and cell enlargement, leading to improved fruit size and uniform growth. Exogenous application of auxins can induce parthenocarpy and increase yield in several fruit crops. Proper dose and timing of auxin application are essential for achieving better fruit quality and productivity.

## INTRODUCTION

In horticultural farming, fruit set, fruit retention, size, and quality directly decide the income of farmers. Poor fruit set, large flower drop, tiny fruits, and early fruit fall are frequent issues that many farmers deal with, particularly in adverse weather circumstances like high temperatures, droughts, or limited pollinator activity. These issues lower market value and yield. One of the most effective solutions to these issues is the proper use of plant growth regulators (PGRs). Auxin is one of the most crucial plant hormones for increasing horticulture crop fruiting. Better fruit set, healthy fruit growth, fruit drop avoidance, and consistent fruit development are all aided by auxin. Farmers frequently use auxin-based plant growth regulators in crops like mango, citrus, tomato, brinjal, apple,

grapes, and guava due to these advantages. This article explains the role of auxin in fruiting in a simple and farmer-friendly way, with emphasis on practical benefits and field application.

**Auxin**

Indole-3-Acetic Acid (IAA) is the primary natural form of auxin, a vital class of plant hormones that control growth, development, and environmental responses mainly by encouraging cell elongation, division, and differentiation. Produced in the tips of shoots, it influences gene expression to regulate activities such as rooting, apical dominance, fruit development, and tropisms (bending toward light or gravity). In farming, synthetic auxins such as: Naphthalene Acetic Acid (NAA), 2, 4-D, Indole-3-butyric Acid (IBA) are commonly used because they are stable, effective, and easy to apply.

**Role of Auxin in Fruit Set**

Many times, flowers fall without forming fruits due to poor pollination, high temperature or cold stress, moisture stress, nutrient deficiency and hormonal imbalance. When pollination or fertilization is weak, the plant does not receive a signal to convert flowers into fruits. After successful fertilization, developing seeds produce auxin, which signals the plant to start fruit development. When this natural auxin is low, external application of auxin helps in triggering fruit set.

**Table.1: Auxin Application Rates for Fruit Set / Fruit Drop in Horticultural Crops**

| Horticultural Crop | Auxin Used | Recommended Dose | Application Timing / Notes | Reference |
|---|---|---|---|---|
| **Mango** | 2,4-D | ~20 ppm (2 g in 100 L water) | To reduce flower/fruit drop in April–May | ICAR Kharif Agro-Advisories for Farmers 2025 |
| **Mango / Citrus** | NAA | ~20 ppm | In intercropped conditions where 2,4-D is not advised | ICAR Kharif Agro-Advisories for Farmers 2025 |
| **Citrus** | 2,4-D | ~20 ppm | To control pre-harvest fruit drop | ICAR Kharif Agro-Advisories for Farmers 2025 |
| **Litchi** | NAA | 20 mg/litre as spray | Reducing cracking of fruits | ICAR Kharif Agro-Advisories for Farmers 2025 |
| **Apple** | NAA | 10 ppm | In thinning excess fruit, promoting better growth of the remaining fruits/ apply 7-35 Days After Full Bloom (DAFB) | ICAR Kharif Agro-Advisories for Farmers 2025 |
| **Khasi Mandarin** | NAA | 50 ppm (Planoix 0.5 ml/L) | To prevent excessive fruit drop | ICAR Kharif Agro-Advisories for Farmers 2025 |
| **Sweet Orange / Citrus** | 2,4-D | ~20 ppm | Reported to increase fruit size, weight, number of fruits | Dalal, R. P. S., Vijay, V., Saini, H., & Rana, G. S. (2019) |
| **Sweet Orange / Citrus** | NAA | ~50 ppm | Similar trial reported improved fruit quality/size | Dalal, R. P. S., Vijay, V., Saini, H., & Rana, G. S. (2019) |

**Precautions**

1. **Follow Label Rates Strictly:** The most important safety measure is to adhere to the manufacturer's suggested dosage for a particular crop and desired result.
2. **Optimal Timing is Crucial:** The plant's reaction to auxin is strongly influenced by the stage of fruit development. Naphthalene acetic acid (NAA), for instance, must be applied as soon as the first intact apples start to fall in order to avoid pre-harvest drop; applying it too early or too late decreases its effectiveness.
3. **Specificity of Species and Cultivars:** Effect of auxin differs significantly between fruit species and even cultivars. While auxin encourages ripening in apples and peaches, it inhibits it in tomatoes.
4. **Observe the Health of the Plant:** Auxins should only be applied to robust, healthy trees. Stressed plants may react poorly to the treatment or be more vulnerable to damage from insects, disease, drought, or nutrient shortages.

## CONCLUSION

Auxin is a potent plant hormone that is vital to horticulture crops' growth, development, and fruit set. When applied properly, auxin increases fruit yield and storage life, improves quality, and helps growers meet market expectations. Understanding how and when to apply auxin can bring practical benefits in orchard and field management.

## REFERENCES

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