EFFECT OF GROWTH REGULATORS ON GROWTH, FLOWERING AND PRESERVATIVES ON QUALITY AND VASE LIFE OF GYPSOPHILA (*GYPSOPHILA PANICULATA* L.) CV. PEARL BLOSSOM

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Introduction:

Gypsophila, once considered just a filler flower, has gained popularity in modern floristry for its style, symbolism, and eco-friendliness. It is now widely cultivated across major Indian cities due to increasing consumer demand.

Valued as a cut flower, Gypsophila is commonly used in bouquets, borders, beds, edges, and rock gardens. G. paniculata roots contain saponins, used as natural detergents, biological control agents against nematodes, and in herbal remedies for cough and digestion.

Plant growth regulators (PGRs) play a vital role in modifying plant growth and development. Growth promoters enhance flowering, advance blooming, and extend the shelf life of cut flowers. They improve plant efficiency by regulating key physiological processes like photosynthesis, transpiration, and nutrient uptake.

The effectiveness of PGRs depends on their concentration, method, and frequency of application. Their use has revolutionized ornamental crop cultivation, boosting commercial floriculture.

With the flower industry booming, Gypsophila ranks among the top ten commercial cut flowers globally. Its hardy perennial nature makes it a reliable substitute in off seasons. However, 30–50% of cut flower losses occur due to poor post-harvest handling.

Despite global research, practical post-harvest solutions are still limited. Enhancing vase life requires improved production techniques, proper harvesting, and the use of effective chemicals.

Objectives:

1. To evaluate the effect of gibberellic acid, benzyl adenine, salicylic acid on growth and flowering in Gypsophila.

2. To assess the effect of floral preservatives on quality and postharvest vase life of Gypsophila.

Methodology

Experiment 1: Effect of Plant Growth Regulators on Growth and Flowering of Gypsophila

The experiment was conducted at the Department of Floriculture and Landscape Architecture, College of Horticulture, Bagalkot, UHS Bagalkot, using a Factorial Completely Randomized Design (FCRD) with 19 treatments and 2 replications. Three growth regulators GA_3, BA, and SA were applied at three concentrations each under two spray schedules (single spray at 30 days and double spray at 45 days after pinching), along with a water spray control.

Treatment combinations included:

GA_3: 350, 450, 500 ppm, BA: 150, 250, 350 ppm and SA: 100, 150, 200 ppm. Each at single and double spray intervals, totaling 18 combinations plus a control.

Observations recorded at 30, 60, 90, and 120 days after spraying:

Growth & Flowering Parameters:

- Plant height and spread (E-W & N-S)
- Number of primary and secondary branches
- Primary branch length
- Stem girth, chlorophyll content
- Days to flower bud initiation and 50% flowering
- Panicles per stalk, days to flower opening, flowering duration

Yield & Quality Parameters:

- Panicles and stalks per plant
- Fresh weight of flowering shoot

- Cut flower yield per plant
- Number of nodes, internodal length, stalk length
- Vase life (in days)

Experiment 2: Effect of Floral Preservatives on Post-Harvest Vase Life

Conducted in a Completely Randomized Design (CRD) with 14 treatments and 2 replications, using chemical and botanical preservatives.

Preservatives tested:

- Sucrose (2%) + Citric Acid (CA 100 ppm)
- Salicylic Acid (SA), Silver Thiosulphate (STS), 8-Hydroxyquinoline Sulphate (8-HQS)
- Botanical extracts: Moringa (25%), Clove (0.25%), and Eucalyptus (25%)

Post-harvest observations recorded at 2-day intervals:

Solution uptake, water loss, optical density of vase solution, Vase life, relative water content, physiological weight changes, Fresh and dry weight, water balance, freshness index (hedonic scale), pH and water uptake/loss ratio.

Result and Conclusion:

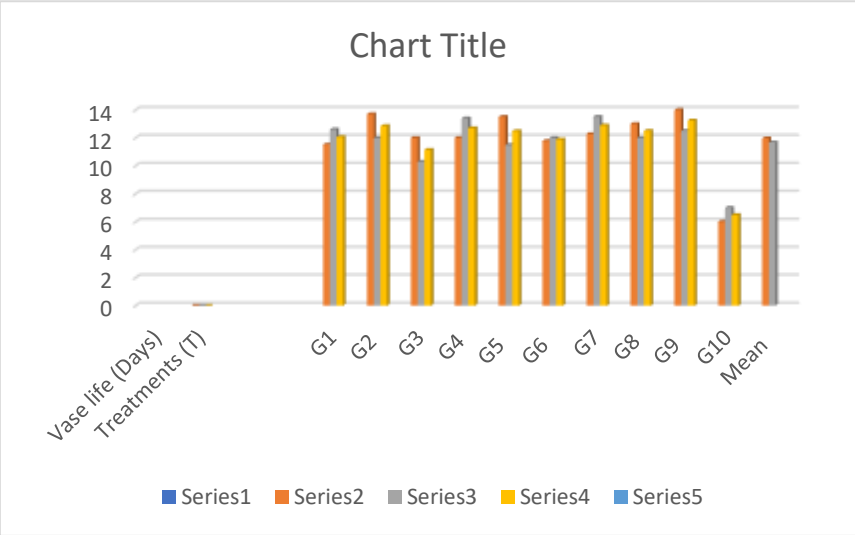

Figure.1: Effect of Pre harvest application of Growth regulators on Vase life (days)

Interaction between growth regulators and application schedule had significant effect on vase life. The maximum vase life of (14.00 days) was recorded in the flowers collected from the treatment SA 200 ppm + single spray (G_9S_1) while lowest vase life was recorded in control ($G_{10}S_1$ - 6 days) with single spray of water.

Salicylic acid (SA), a naturally occurring phenolic compound, plays a significant role in enhancing the post-harvest life of cut flowers. It is known for its ability to delay senescence by reducing oxidative stress, maintaining membrane stability, and enhancing the activity of antioxidant enzymes.

In vase solutions, SA helps suppress microbial growth in the holding water, thereby improving water uptake and preventing vascular blockage in flower stems. It also regulates ethylene production, a hormone responsible for accelerating flower aging and petal wilting.

Project Outcome & Industry Relevance:

Gypsophila, being an exotic and high-value flower, holds great potential to uplift the floriculture sector. Its increasing demand in both domestic and international markets makes it a promising crop for commercial cultivation. The delicate appearance, long vase life, and year-round utility in floral arrangements make it a favourite in global floral trade. With proper production and post-harvest handling techniques, Gypsophila can become a key export-oriented crop.

This will open up new avenues for Indian farmers to access premium markets abroad. Encouraging its cultivation can contribute significantly to the country's floriculture export earnings. It also creates opportunities for rural employment, value addition, and agro-based entrepreneurship. The integration of improved technologies and training will further boost its production and quality.

Government support through export incentives and infrastructure can strengthen the supply chain. Farmers growing Gypsophila can benefit from higher returns compared to traditional crops. With a focused approach, this flower can play a vital role in transforming floriculture into a profitable venture. It serves as a sustainable and lucrative alternative in the ornamental horticulture landscape.

Thus, promoting Gypsophila cultivation aligns with both economic growth and global market trends.

Working Model vs. Simulation/Study:

This research is primarily a simulation or theoretical study, focusing on understanding the potential impact of various growth regulators, preservatives, and cultivation techniques on Gypsophila. While the findings are based on experimental designs and theoretical models, practical implementation in real-world conditions could provide further validation. The study aims to lay the foundation for future experimental research and commercial applications of Gypsophila in floriculture.

Project Outcomes and Learnings:

Growing of gypsophila with use of growth regulators sprays twice at 30 and 45 days after pruning was found effective in promoting growth and flowering of Gypsophila.

Further outcomes should be analysed and learning to be found out accordingly.

Future Scope:

- Evaluation of advanced agronomic practices for enhancing flower yield in Gypsophila.
- Exploration of nanoparticle-based formulations to improve vase life and post-harvest quality.

- Use of eco-friendly, homemade preservatives derived from locally available materials to extend vase life.
- Study of combined effects of different plant growth regulators and bio-stimulants on growth, flowering, and quality traits.
- Assessment of organic and sustainable inputs for commercial Gypsophila cultivation.
- Development of region-specific cultivation protocols for maximizing productivity.
- Investigation into the physiological and biochemical mechanisms underlying improved flower longevity.
- Screening of new genotypes for better yield, quality, and stress tolerance.
- Cost–benefit analysis of different growth regulator and preservative treatments.
- Studies on integrated nutrient and water management practices for sustainable cultivation.