

AICRP- FLORICULTURE

Objectives

- Collection, evaluation and maintenance of germplasm of different mandated flower crops
- Testing of new varieties released by various coordinating centres under *tarai* region of Uttarakhand
- Standardization of production technologies of flower crops under open and polyhouse conditions
- Standardization of post-harvest technologies of flower crops.

1. Significant Achievements:

Germplasm conservation, evaluation and crop management

Chrysanthemum

Pantnagar Centre of AICRP on Floriculture has a rich collection of 90 varieties of chrysanthemum collected from different parts of the country and are being maintained at Model Floriculture Centre, Pantnagar.

- Cultivars that are recommended for commercial cultivation for cut flower purpose include for cut flower: Suneel, Pusa Centenary, Thai Chin Queen, UHFS Chry 81 and Sova. Whereas for loose flower: Prof. Harris, Ajay,



Fig. 1: Chrysanthemum germplasm at GBPUA&T, Pantnagar

Purnima, Baggi and Gauri and for pot mum: Sadbhavana, Mother Teresa and Suhag Singar were found to be suitable for tarai region of Uttarakhand.

- Among the various media tried for standardization of optimum production (open conditions) under tarai conditions, media consisting of cocopeat + sand + FYM + vermicompost (2:1:0.5:0.5) was found best for growing of chrysanthemum cv. Mother Teresa.
- Under post-harvest experiments; cellophane sleeves proved best for enhancing vase life, flower diameter as well as showing minimum decrease in fresh weight of flowers and hence can be recommended as a packing material for chrysanthemum cv. Snow Ball under Pantnagar conditions for local and nearby markets.

Rose

- As many as 44 cultivars belonging to Hybrid Tea, Floribunda and Miniature roses have been



Fig. 2: Drip irrigation and fertigation installed in tuberose

collected from different parts of the country and are being maintained at this centre. A total of 30 Hybrid Tea followed by 11 Floribunda and 3 Miniature cultivars are collected in roses.

- Based on the overall performance of germplasm and post harvest studies, varieties Happiness, Avon, Mrinalini, Raktagandha, Arjun and Eiffel Tower and Super Star in Hybrid Tea group and Yellow Contempo and Suryakiran in Floribunda group and Gruss-an-Teplitz among shrub roses were found to be promising for tarai region. Genotype Raktagandha had maximum shelf life of two weeks.
- Among the various media tried for standardization of potting media composition for different classes of roses under tarai conditions, it can be concluded that media consisting of Vermicompost + Perlite + Vermiculite (3:1:1) was found best for growing of different classes of roses under pot production.
- Under organic studies in rose, 50% recommended dose of fertilizers + 3% Manchurian Tea + 3% Panchgavaya showed maximum number of flowers per plant, flower length and flower stem length.
- Under weed management studies in rose, 100 μ black polythene mulch was found best in rose cv. Laher for plant spread, number of branches per plant, days to flowering, flowering duration, number of flowers per plant, flower diameter, length of flower bud, vase life, etc.
- For control of aphids and thrips in roses, monocrotophos (0.2%) and phosphomidon (0.2%) were most effective followed by quinalphos (0.2%) and dimethoate (0.2%), whereas, neemx (0.02%) and vertimec (0.1%) are least effective and not to be recommended for the control of aphids and thrips.

Gladiolus

- The germplasm collection consists of 70 cultivars collected from different parts of the country. The varieties Pink Friendship, Hybrid-10, Green Pasture, Nova Lux, Charm Glow, Sringerica, Subhangini, Oscar, Chipper, Regency and GSS can best be utilized for better

garden display, which flowered for a period more than one month. Amongst all the varieties Pink Friendship, Subhangini and Hybrid-10 were found most ideal for amongst all desired characters viz., earliness of flowering, spike length, number of floret per spike, duration of flowering, vase life and yield of spike per plant.

- The maximum spike length was recorded with Oscar (123.28 cm) followed by White Prosperity (115.38 cm) and was found to be at par with Candy Man (115.12 cm) while minimum length was recorded with Dhanvantri (52.58 cm).
- Data on vase life was recorded and found that maximum days to wither 6th floret was observed with Nova Lux (26.35 days) and earliest withering was shown by Punjab Morning (11.22 days) which was remaining *at par* with Sunset Sky, Her Majesty, Eurovision and Snow Princess.
- Under organic studies in gladiolus, Panchagavya - 2% was found best for average spike length, total number of florets/ spike, average size of florets, vase life in plain water, etc.
- Under integrated nutrient management studies in gladiolus, 75% recommended dose of fertilizer + FYM (2 kg/m²/y) + vermicompost (300 g/m²) + *Azospirillum* + Phosphorus Solubilising Bacteria was found best for plant height, length of spike, total number of florets/ spike, weight of spike, size of floret, vase life, size of corm, etc.
- Under post harvest management studies holding solution of sucrose (4%) + Al₂(SO₄)₃ (300 ppm) + NaOCl (25ppm), was found best to improve keeping quality in the American Beauty and Nova Lux cultivars of gladiolus.
- The best packaging material for gladiolus spikes of variety White Prosperity was polypropylene 100 μ sleeve followed by cellophane sleeves. The best dry storage period was found to be 9 days in cultivar Subhangini.
- Polypropylene (PP) 25 μ without perforation was found best among packaging material for long term

modified atmosphere storage in gladiolus cv. White Prosperity

- Under weed management studies in gladiolus, pre-emergence application of Pendimethalin (1.0 kg a.i./ha) was found best to exhibit lowest dry weight of weeds and better floral attributes.
- Under integrated disease management studies in gladiolus, corn dip in carbendazim (0.2%) + soil application of *Trichoderma viride* (100.0 g) after mixing in 1.0 kg FYM at the time of planting was found best and significantly lower Fusarium wilt disease severity (16.52%).
- Under chemical disease, management studies in gladiolus, Bagalol-6 (0.2%) was found the most effective in reducing the Fusarium wilt disease severity (20.47%), which was at par with the disease severity recorded from rest of the fungicides tested. Indofil M-45 (0.2%) was the best among the tested Fungicides in reducing the Botrytis blight disease, which was at par with the result of Kavach (0.2%) and Bavistin (0.1%).

Tuberose

- Under collection and maintenance of germplasm, the centre has a collection of 20 varieties of tuberose. **Single:** Shringar, Prajwal, Single, Hyderabad Single, Kalyani Single, Sikkim Selection, STR-505, GKTC-4, Arka Nirantara, Phule Rajani, Mexican Single, Bidhan Rajani H-1 and Bidhan Rajani H-2. **Double:** Swarna Rekha, Suvasini, Double, Hyderabad Double, Vaibhav, Calcutta Double, Pearl.
- Single type varieties viz., Shringar, Prajwal, Arka Nirantara and double types like Suvasini and Vaibhav are promising for flower production in tarai region of Uttarakhand.
- Under packing materials for post harvest management studies, tuberose spikes wrapped in newspaper with storage duration of 24 hours at 4°C had the longest vase life (6.66 days), maximum opened florets (22) and per cent opened florets (71.29) as compared to other packing materials.

- Among the different wrapping materials and storage conditions, vase life of the cut spikes of cv. Kalyani Double was found to be maximum (8.50 days) in the treatment combinations of polypropylene (PP) 200 gauge stored for 48 hours at 10°C temperature. This treatment combination also resulted in higher percent water loss at wilting (32.67) and average percent water uptake (14.77) percent water uptake at senescence.
- Under integrated nutrient management studies in tuberose, Panchgavya (4%) was found best for in cv. Double for floret diameter, days taken to 50% flowering, number of florets/ spike, number of opened florets/ spike, duration of flowering, spike yield/ m².
- Fourteen varieties of tuberose were evaluated for essential oil extraction. Maximum essential oil recovery from opened florets was obtained from the variety Shringar (37.63 ml/100g opened florets) as compared to the minimum (27.55) in variety Double. Among all varieties, per cent concrete recovery was found to be more in case of opened florets as compared to unopened florets. The concrete turned black in unopened florets. Maximum concrete recovery was obtained from the variety Shringar (0.0597 %) as compared to the minimum in variety Double (0.0263 %).
- Under post harvest studies, vase life was highest in citric acid (300 ppm) + sucrose (2%) in tuberose.

Gerbera

- Twenty-two cultivars of gerbera collected from various parts of the country were tested under Pantnagar conditions. Cultivars Diablow, Rosabella, Kozak, Essance and Alsmeeera were most suitable for various floral attributes like flower diameter, flower stalk length, flower stalk diameter, days to first flower bud appearance, number of flowers per plant, etc.
- For early flowering, gerbera cultivars Funda and Diablow were found suitable.

Marigold

- Plants transplanted in November produced maximum flowers/plant (45.00) and flowers/m² (240.00). Marigold cv. Pusa Narangi Gaiinda, plants transplanted in November produced maximum number of branches/plant (8.66), maximum flowers/plant (47.67) and flowers/m² (244.70). Whereas, September and December transplanted plants had maximum size (6.81 cm) and weight (7.58 g) of individual flower, respectively.
- Under weed management studies, Oxyfluorfen (0.2 kg a.i. ha⁻¹+ 2 hand weedings) found best for marigold variety Pusa Narangi Gaiinda.

Crop Improvement

- Under testing of new genotypes of chrysanthemum, Variety HCC-1 was found better than HCC-2 in yield and quality parameters.
- Under testing of new genotypes of gladiolus, Hybrid 10 and Subhangini were found to be the best in all respects. Two new cultivars viz. Punjab Dawn and IIHR Hyb. 87-22-I were also evaluated at this centre. IIHR Hyb 87-22-I was found more promising than Punjab Dawn for this region.
- Under testing of new genotypes of tuberose, cultivars Prajwal, Bidhan Rajani H-1, Bidhan Rajani H-2 and Vaibhav are promising for flower production in *tarai* region of Uttarakhand.
- Under drip irrigation and fertigation studies in tuberose, application of 125% recommended doses of fertilizers using water soluble fertilizers initiated spike emergence in minimum days (116.0 days). This treatment also produced maximum number of spikes per plant (6.0) and vase life of flowers (14.0 days). However, diameter of florets (5.08 cm) and weight of spikes (161.33 g) were maximum in 75% recommended doses of fertilizers using water soluble fertilizers.

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