

23. IIHRMGYP-1 (IC0613361; INGR15036), a Marigold (*Tagetes erecta* L.) Germplasm with Petaloid Sterile Flowers; Ability to be Multiplied by Cuttings

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IIHRMGYP-1 is a petaloid male sterile genotype useful for breeding program. Flowers are male sterile consisting of only ray florets with well developed gynoecium and are devoid of disc florets. The genotype can be maintained by vegetative propagation through tip cuttings. With high yielding potential, it has the potential for flower production besides being a valuable genetic stock for hybrid seed production.

Marigold (*Tagetes* spp.) is one of the most popular flowering annuals grown for loose flowers, landscape gardening and pot plants. The flowers are suitable for garlands and floral decorations. Marigold is also widely used as an ingredient for nutraceutical, cosmetic, and pharmaceutical applications. In India, Marigold occupies the first position among flower crops in terms of area covered. As per the estimation of NHB data for the year 2013-14, out of the 255.02 thousand ha. area under flower crops, marigold is covered in an area of 55.89 thousand ha.

Though marigold is being widely used in India, there are not many varieties available and F_1 hybrids are being imported from outside the country and are gaining popularity considering their flower quality and production potential. Identification of male sterile lines is important for exploitation of heterosis and hybrid development. Not much information is available on male sterility in marigold. All the information available about male sterility is limited to apetaloid type of sterility where in flower petals are degenerated (He *et al.*, 2010; Gupta *et al.*, 2013).

Ongoing research program at Indian Institute of Horticulture Research, Bengaluru is focused on development of male sterile lines as a prerequisite for heterosis breeding. Crosses are attempted between plants from wide genetic background to create variability and for introgression of characters. Individual plant selection made in the breeding population has resulted in a pool of genetic stocks varying in morphological and reproductive characters. IIHRMGYP-1 is an individual

plant selection from the segregating population resulting from hybridization between MG-87 and MG-32. The parents, MG-87 and MG-32 were heterogeneous and heterozygous population and crossing were attempted between selected plants. From the resulting segregating population, promising progeny plants were selected and multiplied by vegetative propagation followed by clonal selection.

Marigold belongs to Asteraceae family characterized by capitulum inflorescence with peripherally located ray florets and disc florets in the centre. For commercial utility, these inflorescences are considered as flowers and ray and disc florets are considered as petals. Flowers of IIHRMGYP-1 are yellow gold in colour with RHS colour chart No. 12-A in Yellow Group. Distinct features of the genetic stock are its double flowers that are sterile. Sterile flower devoid of petals with all the petals converted to stigma was reported in marigold (He *et al.*, 2010). On the contrary, flowers of novel genetic stock IIHRMGYP-1 developed at IIHR is a petaloid male sterile with double flower type filled with ray florets and are devoid of disc florets and androecium. Plants are of medium height (70 cm), with spreading plant habit and strong branching. All the reported variability in marigold are related to quantitative characters and not much information is available on variability available in sterile types (Singh and Misra 2008; Yuvraj and Dhatt 2014).

In general, marigold varieties are multiplied by seeds and are also amenable for tissue culture (Gupta *et al.*, 2013). We have observed IIHRMGYP-1 having the ability to be propagated by vegetative propagation. We were able to establish a population of IIHRMGYP-1 by tip cuttings and production potential was estimated in replicated trials in comparison with check varieties.

Performance evaluation of IIHRMGYP-1, over three years in replicated trials has revealed it to be having higher production potential compared to the check varieties that includes pure lines of IIHR (IIHRMY4 and IIHRMY5), a high yielding variety 'Pusa Basanthi' and a commercial

Table 1. Production evaluation of IIIIRMGYP-1 in comparison with check genotypes

Genotypes	No of flowers/plant	Flower wt (gms/flower)	Flower yield/ plant (gms)
IIHRMYP 1	150.8	6.0	904.8
IIIIRMY 4	125.8	5.5	691.9
IIHRMy 5	127.6	5.4	689.0
Pusa Basanthi	119.8	5.2	623.0
F1 Hybrid Gold	118.1	6.1	757.8
c.d@5%	4.3	0.3	249.1
C.V %	6.1	2.9	8.4

hybrid variety 'F₁ Hybrid Gold' (Table 1). IIHRMGYP-1 has the potential for commercial flower production and with its sterile flowers can also be exploited for hybrid seed production.

References

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