

# A Monitoring Based Report On Suitability Trial of Exotic Tulip Flowers at Munsyari Region of Forest Research Range Pithoragarh

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**Introduction-** Tulip is member of lily family, Liliaceae, along with 14 other genera where it is most closely related to *Amana*, *Erythronium* and *Gagea* in the tribe Liliaceae. Tulips are belonging a genus *Tulipa*. It is a genus of spring-blooming perennial herbaceous bulbiferous geophytes (having bulbs as storage organs). The flowers are usually large, showy and brightly coloured generally red, white, yellow and pink. Some hybrid varieties of tulip also found in bright bi colours flower. Sometimes the flower has also a different coloured blotch at the base of the tepals (petals and sepals, collectively), internally. Because of a degree of variability within the populations, and a long history of cultivation, classification has been complex and controversial. The name “tulip” is thought to be derived from a Persian word for turban, which it may have been thought to resemble. Tulips originally were found in a band stretching from Southern Europe to Central Asia, but since the seventeenth century have become widely naturalised and cultivated. In their natural state they are adapted to steppes and mountainous areas with temperate climates.

Flowering of tulip occurs in the spring, they become dormant in the summer once the flower and leaves die back, emerging above ground as a shoot from the underground bulb in early spring.

**History-** Tulip grows in wild in the Tien Shan Mountains and were cultivated in Istanbul in 1055. **In the 15<sup>th</sup> century, tulips were among the most prized flowers;** the flower was the symbol of Ottomans. While tulips had probably been cultivated in Persia from the tenth century, they did not come to the attention of the West until the sixteenth century, when western diplomats to the Ottoman court observed and reported on them. They were rapidly introduced into Europe and became a frenzied commodity during Tulipmania. Tulips were frequently depicted in Dutch Golden Age Paintings, and have become associated with the **Netherlands, the major producer for world markets**, ever since. In the seventeenth century Netherlands, during the time of Tulipmania, an infection of tulip bulbs by the tulip breaking virus created variegated patterns in the tulip flowers that were much admired and valued. While truly broken tulips do not exist anymore, the closest available specimens today are part of the group known as the Rembrandts- so named because Rembrandt painted some of the most admired breaks of his time. Nowadays with the help of breeding programmes producers had produced thousands of hybrid and cultivars in addition to the original species (in horticulture they are known as Botanical tulip).

**About Suitability trial experiment-** As tulip is a fascinating high cost flowering plant, a suitability trial in the year 2018 on the basis of its natural habitat condition was started in forest research range nursery Patalthor Munsyari at an altitude of about 2500 meter. The main objective of this experiment was to check the germination capacity, growth condition and survival of this economically valuable exotic species of ornamental flower under the adverse climatic and edaphic conditions of the high altitude temperate or sub-alpine area. Another objective of this experiment was to study the fact whether its cultivation is economically beneficial or not for the local people and precaution to be taken for its better production.

**Methodology-** The experiment was applied and studied during two continuous financial years viz. 2018-19 and 2019-20. During both financial year different parameters were applied with different numbers of sown bulb. In the first year all bulbs were sown under shed house. Whereas in the second year three parameters were applied i.e. (I) Bulbs were sown in the open beds at a high waterlogged area, (II) Bulbs were sown in the open beds with well-drained soil, and (III) Bulbs were sown under partial shed with proper sunlight area in pots with well-drained soil mixed with compost material. These all three parameters were applied to study and check what factors are beneficial or harmful for this exotic flowering plant in this area.



1. Bulbs sown in open beds at a waterlogged area during Phase II in experiment trial



2. Bulbs sown in well-drained soil bed with direct sunlight during Phase II experiment trial



3. Bulbs sown in pots and polybags under partial shed with proper sunlight Phase II experiment trial

## Result-

**Phase 1 (During financial year 2018-19)-** Under phase first in the year 2018-19 a total of 72 bulbs were planted under shed house. Out of 72 bulbs a total of 64 bulbs germinated and also flowered. It had shown both 89% germination and flowering of planted bulbs. The bulbs were sown in mid-December and the germination started in the month of January. So it took around 25 days for germination. Whereas flowering occurred in the month of February and continued till mid-march. The first flower emerged on date 13 Feb 2019 and survived till 13 April 2019, so it showed the survival period of flowers was around 2 months. In the month of June bulbs were dug. As tulip bulbs have the capacity to multiply themselves, so at the time of collection a total of 96 bulbs were collected and stored in a cool dry place inside a polybag by separating four layers through newspaper and 24 bulbs in each. Proper checking for fungus and other disease on bulbs were done time to time till next planting done (In the month of September) for phase II study.



4. Flowers of tulip blooming during first phase experiment

Table 1 Summary of resulted data obtained from phase one experiment

Growing place & Soil media	Total no. of bulbs sown	Total no. of bulbs germinated	No. of days taken till germination	Germination percentage	No. of days taken for first flowering	Survival days	Remark
Under partial shed house on polybags, Soil media: Soil:Sand:Vermicompost-3:2:1	72	64 *8 bulbs were damaged by rodents.	25	89%	2 months	2 months	Protection by rodents was necessary, proper sunlight with partial shed was good for better germination and flowering in this high altitude snowfall area.

**Phase II (During financial year 2019-20)-** Under phase II during the year 2019-20 a total of 246 (150 new and 96 stored from the phase I) bulbs were planted in different months. Bulbs stored from phase I were planted in the month of September in three parts viz. 32 in partial shed house with proper sunlight, 32 in open bed with well-drained soil and 32 in open bed with waterlogged soil respectively. Whereas Out of 214 bulbs all-new ordered bulbs (150) along with old stored bulbs (32) were planted under partial shed house with proper sunlight. In other words, out of total 214 bulbs 64 bulbs were planted in open area and 182 bulbs were planted under shed house with proper sunlight. In open condition out of 64 bulbs 56 (87.5%; 32 in bed with well-drained soil, 24 in waterlogged soil) bulbs were germinated. whereas in shed house with proper sunlight condition out of 182 bulbs a total of 174 (95.60%) were germinated.

\* all new bulbs were planted under shed house due to two reason; as the open bed area were fully covered by snow and phase I experiment showed good result under shed house.



5 Germinated bulbs in open bed with water logged area



6 Germinated bulbs in open bed with well-drained soil



7 Germinated bulbs under shed house with proper sunlight



8 Sown Bulbs (stored from phase I & panted in open beds) in phase II under the soil during snow-covered period in the month of January in open beds



9 Flowering in tulip bulbs in open bed area with well-drained soil on date 8 May 2020 (2 out of 32)



10 Flowering in tulip bulbs in open bed area with water logged soil on date 8 May 2020 (0 out of 32)



11 Flowering in tulip bulbs in shed area (stored from phase I) on date 24 April 2020 (overall 23 bulbs were flowered out of 32)



12 Flowering in tulip bulbs under shed area on date 8 May 2020

The obtained results of the experiment under phase II are shown with remarks in the following table by summarizing all data: -

Name of Block and Place condition	Flower Colour	No. of bulbs shown		No. of bulbs germinated		Germination percentage(%)		Total no. of germinated plants flowered		Flowering percentage(%)		Highest survival days of flower		Average Maximum flower stem height & flower height		Remarks
		New	Old stored from phase I experiment	New	Old stored from phase I experiment	New	Old stored from phase I experiment	New	Old stored from phase I experiment	New	Old stored from phase I experiment	New	Old stored from phase I experiment	New	Old stored from phase I experiment	
<b>Block 1</b> Proper sunlight area with partial shade	Pure White	14		13		92.86		13		100.00		55		30cm&7cm		Good germination and flowering
	Red	18		13		72.22		10		76.92		52		20cm&6cm		Good germination and Flowering
	Yellow Red	32		29		90.63		25		86.21		60		60cm&8cm		Good germination and Flowering
	bicolour(Purple white)	30		17		56.67		7		41.18		40		40cm&6cm		Low germination and Low flowering
	Yellow	11		8		72.73		5		62.50		50		25cm&5cm		Moderate germination and low flowering
	White with red	23		22		95.65		22		100.00		55		50cm&7cm		Good germination and flowering
	Pinkish red white	22		19		86.36		18		94.74		52		52cm&8cm		Good germination and flowering
	Mixed colour old bulbs (stored from phase I)	0	32	0	32		100.00		23		71.87		60		55cm&8cm	
<b>Total</b>		<b>182</b>		<b>153</b>		<b>84.07</b>		<b>123</b>		<b>80.39</b>		<b>53</b>				
<b>Block 2 Bed with well-drained soil in open area</b>	Mixed colour		32		32		100.00		2		6.25		25		20cm&5cm	Good germination but very less flowering
<b>Block 3 Bed in</b>	Mixed colour		32		24		75.00		0		0.00		0		0	Low germination

waterlogged area in an open area																n and no flowering
Total		64	56	87.50	2	3.57		25								

**Observation of effect of tulip as an exotic on other surrounding plants-** As tulip is an exotic species and it has also toxicity content in it. It was important to observe the effect of this exotic species on other native plant species, during the primary observation no harmful effect were seen on surrounding plants and also on soil fertility by any parts of this plant.

**Conclusion-** According to Phase I & Phase II trial various result were observed and studied, these results are follows-

1. As Generally tulip grows well in open areas but here according to climatic conditions and edaphic factors of Munsyari area it will be good to plant them under semi shed area with proper sunlight.
2. Waterlogged area is showed good germination but it does not show any flowering that means such kind of areas should be avoided during plantation.
3. If planting in open areas, the bed should be designed as raised bed with well-drained soil.
4. Proper shade care by hailstorm, heavy rainfall & snowfall is necessary from germination to till flowering in open beds.
5. Overwatering to the bulbs is very harmful for flowering, as it shows good germination but bulbs become dead before the flowering time.
6. As tulips are poisonous, so there is no need to worry about the biotic disturbances, but rodents like poisonous animal can damage the bulbs.
7. As flower full blooms and petals falls down they should be removed from the beds or pots otherwise they cause damage to the bulbs & dying off of leaves.
8. As Munsyari area have high snowfall in winters, it is good for tulip bulbs as they need chilled temperature for better germination but one thing should be kept in mind that bulbs should be planted on a standard depth i.e. around 15 cm deep under the soil, so it will protect them by excessive water stored on soil surface. Proper spacing in between bulbs i.e. around 12-15 cm is also good.
9. As Munsyari area has high rainfall throughout the year it is necessary to dig up the bulbs after leaves died off and store them for next year plantation, because excessive water is harmful for tulip bulbs. Leaving them in open beds proper water canals and overhead protection around the planting area is needed to remove excessive water during heavy rainfall days.
10. Overall well-drained soil, proper sunlight area with partial shade, area with protection from waterlogging and heavy rainfall are good for tulip.