

# Influence of ~~different~~ planting dates on the survival and growth parameters of different cultivar of Ber (*Zizyphus mauritiana*) ~~at...~~

## Abstract

The present investigation entitled “~~Influence of different planting dates on the survival and growth parameters of different cultivar of ber (*Zizyphus mauritiana*)~~” was conducted in Department of Horticulture, Sam Higginbottom University of Agriculture, Technology & Sciences Prayagraj during ~~ferbruary 2023 to august 2023~~. A field experiment was conduct with 3 varieties viz. V<sub>1</sub> (Apple ber), V<sub>2</sub> (Kashmiri ber), V<sub>3</sub> (Miss ~~india~~India) ~~planted with at~~ different planting dates viz. ~~15<sup>th</sup> february~~February, 1<sup>st</sup> ~~M~~march, 15<sup>th</sup> ~~march~~march. The experiment was laid out in randomized block design with 3 ~~replication~~replications and 9 treatment. The result indicated that maximum plant height (~~65.73cm~~) was recorded ~~in from (V<sub>2</sub>) kashmiri (V<sub>2</sub>) (65.73cm)~~ planted on 1<sup>st</sup> march. The miss india variety (V<sub>3</sub>) ~~has which be was~~ planted on 15 february ~~have gave highest the highest~~ no. of leaves (124.50), highest no. of bud break (27.67), maximum no. of branches (12.83) ~~per maximum plant, maximum~~ plant spread East-West (29.50cm), North-South (31.53cm) and highest survival percentage (88.89%). Apple ber (V<sub>1</sub>) planted on 1<sup>st</sup> march ~~having gave the~~ highest leaf area (18.50cm), highest leaf area index (0.037) and highest chlorophyll content (35.10). From the present study it can be concluded that ~~15<sup>th</sup> february~~ transplanting miss India (V<sub>3</sub>) variety on 15<sup>th</sup> February ~~are were the~~ most suitable date ~~for transplanting and miss india (V<sub>3</sub>) variety is that~~ shown significantly superior performance in relation to growth and survival in prayagraj agro-climatic condition.

Keyword: Ber, Varieties, Dates, Different, Planting.

## 1. Introduction

Ber (*Zizyphus mauritiana* Lamk) is popularly called the king of arid zone fruits. It is an important fruit crop for arid and semi-arid regions in tropical and sub-tropical regions. Its origin is India. It is known for its ability to withstand adverse conditions. It is truly a desert apple of Thar Desert. The cultivars Umran, Kathapal and Gola are the most promising varieties of ber in North India. The area under cultivation with this fruit is 8.7 lakh ha with an annual production of 8.9 lakh tones in India.

There are two major domesticated jujubes, *Z. mauritiana* Lam. the Indian jujube or ber, and *Z. jujuba* Mill. the Chinese or common jujube. These two species have been cultivated over vast areas of the Old World and a limited number of others have been, and are, cultivated on a more localised scale. ~~However~~However, all jujubes remain relatively minor crops although demand for production remains steady in many parts where they were originally domesticated.

~~It~~ Ber is deciduous and highly resistant to frost. Its draught hardiness, xerophytic nature, tolerance to salt (40 ESP and 12-15 dSm<sup>-1</sup>), deep tap root system, spiny nature and ability to shed its leaves during hot summer have helped the plant to adopt well to the arid and semi-arid conditions. It can be successfully cultivated even in the most marginal ecosystems of the

**Comment [E1]:** This already indicated by the word dates. So you can delete it.

**Comment [E2]:** Who gave the binomial name? it may need L.

**Comment [E3]:** It is a field experiment which is dependent on environmental condition. Thus, please mention your specific place where the experiment is conduct.

**Comment [E4]:** This shall be replaced by 1 sentence of background information about the crop and statement of problem and also objective of the work. What the relevance of repeating the title here?

**Comment [E5]:** The objective is preferred here.

**Comment [E6]:** You have already mentioned earlier in the previous sentence

**Comment [E7]:** Citation here

**Comment [E8]:** Citation is mandatory here...Where did you take these ideas are they your own?

**Comment [E9]:** Other citation here

**Comment [E10]:** Citation is also required here... It is a scientific paper.

subtropics and tropics. It is cultivated widely for its resistance to grow in drought and other diversified soil and climatic conditions. It is a hardy tree that copes with extremes temperature and thrives under dry conditions. Fruit quality is best under hot sunny and dry conditions but there should be a rainy season to support growth and flowering leaving enough soil moisture to carry the fruit to maturity. The ber plant is quick growing, early bearing and spreading tree. It has remarkable adoptability enabling to grow in wide range of agro-climatic situation and soils.

**Comment [E11]:** Two comments here. The first is why do not you cite here? Where did you took the idea? The other comment is these sentences deal about the background of the crop thus shall come together with the first paragraph.

Establishment of ber orchard is very difficult because of high rate of mortality of young plants at transplanting. This cannot be overcome by budding the seedlings in-situ as it is very tedious process and the trees in the orchard never have a uniform stand. Like other fruit trees, it is desirable to raise budded plants of known varieties, as the seedling trees bear the poor quality fruits of low-commercial value.

**Comment [E12]:** citation

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**Comment [E14]:** at the end you have to add the objective/s of the work

## 2. Material and Method

### 2.1. description of the study area

The present investigation was conducted in at Department of Horticulture, Sam Higginbottom University of Agriculture, Technology & Sciences Prayagraj during february 2023 to august 2023. The experimental site was comes-found under sub-tropical belt in the South Eastern Uttar Pradesh, which experience extremely hot summer and fairly cold winter. The maximum temperature of the location reaches up to 45° C to 48° C and seldom falls as low as 4° C to 5° C. The relative humidity ranged between 20-94%. The average rainfall in this area is around 850-1100mm annually.

**Comment [E15]:** where does this place find? Please add the country.

### 2.2. Treatments and Experimental Design

The experiment consisted of two factors: planting dates (15<sup>th</sup> February, 1<sup>st</sup> march, 15<sup>th</sup> march) and varieties (3 varieties viz. V<sub>1</sub>(Apple ber), V<sub>2</sub>(Kashmiri ber), V<sub>3</sub> (Miss India)). A field experiment was conduct with 3 varieties viz. V<sub>1</sub>(Apple ber), V<sub>2</sub>(Kashmiri ber), V<sub>3</sub> (Miss India) with different planting dates viz. 15<sup>th</sup> february, 1<sup>st</sup> march, 15<sup>th</sup> march. The experiment was laid out in randomized block design Withwith 3 replication and 9 treatment treatments.

### 2.3. Experimental Procedures and agronomic Practices

Land was prepared for ber plants by applying the recommended doses of organic manures (F.Y.M, Vermicompost, Neem cake) and fertilizers. The remaining portions of N.P.K were applied into two equal parts by using around the root zone at 60 and 90 days after planting. Staking of ber plants with stick for giving extra spot to the plant. Staking is absolutely essential during the first two years to train the tree properly. Irrigation along with other cultural operations including plant protection measures were done as and when required.

**Comment [E16]:** Pleas add the plot size, spacing, number of plant per plot and other relevant information here.

**Table 1: Details of treatment combination**

<u>Treatment Notation</u>	<u>Treatment combination</u>
<u>T<sub>1</sub></u>	<u>Apple ber+ (15th february)</u>

<u>T<sub>2</sub></u>	<u>Kashmiri+ (15th february)</u>
<u>T<sub>3</sub></u>	<u>Miss india+ (15th february)</u>
<u>T<sub>4</sub></u>	<u>Apple ber+ (1st march)</u>
<u>T<sub>5</sub></u>	<u>Kashmiri+ (1st march)</u>
<u>T<sub>6</sub></u>	<u>Miss india+ (1st march)</u>
<u>T<sub>7</sub></u>	<u>Apple ber+ (15th march)</u>
<u>T<sub>8</sub></u>	<u>Kashmiri+ (15th march)</u>
<u>T<sub>9</sub></u>	<u>Miss india+ (15th march)</u>

#### 2.4. Data collection

The observations were recorded on randomly selected plants based on vegetative characteristics viz., plant height (cm), bud breaks, number leaves per plant, number of ~~branch~~branches per plant, plant spread (cm) east-west ~~and north~~and north-south, leaf area (cm), leaf area index, chlorophyll content, survival percentage. The ~~growth parameters~~growth parameters were recorded at periodical intervals of 30,60, 90, 120, 180 DAP from the randomly selected plants in each treatment.

**Comment [E17]:** What is the sample size? How the data were collected? Please add this information for each parameter.

#### 3.5. Data analysis

The data was ~~analyzed~~analysed by using the completely randomized block design by applying the technique of analysis of variance by Fisher (1958). The data presented in this paper are the mean values of different parameters and the significance level is compared with the critical difference.

**Comment [E18]:** What is the p value used, the software used ....please add it here.

**Table 1: Details of treatment combination**

<b>Treatment Notation</b>	<b>Treatment combination</b>
<del>T<sub>1</sub></del>	<del>Apple ber+ (15th february)</del>
<del>T<sub>2</sub></del>	<del>Kashmiri+ (15th february)</del>
<del>T<sub>3</sub></del>	<del>Miss india+ (15th february)</del>
<del>T<sub>4</sub></del>	<del>Apple ber+ (1st march)</del>
<del>T<sub>5</sub></del>	<del>Kashmiri+ (1st march)</del>
<del>T<sub>6</sub></del>	<del>Miss india+ (1st march)</del>
<del>T<sub>7</sub></del>	<del>Apple ber+ (15th march)</del>
<del>T<sub>8</sub></del>	<del>Kashmiri+ (15th march)</del>
<del>T<sub>9</sub></del>	<del>Miss india+ (15th march)</del>

### 3. Results and Discussion

The present investigation entitled investigation, “**Influence of different planting dates on the survival and growth parameters of different cv. of Ber (Zizyphus mauritiana)**” was laid out on the experimental site of Department of Horticulture, Sam Higginbottom University of Agriculture Technology & Sciences, Naini, Prayagraj (UP), February to August 2023. The

experiment was conducted in Randomized block design with 9 treatments and three replications.

The results obtained have been summarized below:-

At 180 DAP, The maximum plant height 65.73cm was found in V<sub>2</sub> (Kashmiri, 1st march) and the minimum was recorded in V<sub>1</sub> (Apple ber, 15th march) with 51.20cm.

At 180 DAP, The highest bud break 27.67 was recorded in V<sub>3</sub> (Miss india, 15th february) and the lowest was found in V<sub>1</sub> (Apple ber, 15th march) with 19.00.

At 180 DAP, The maximum leaves 124.50 was found in V<sub>3</sub> (Miss india, 15th february) and the minimum was recorded in V<sub>1</sub> (Apple ber, 15th march) with 92.00.

At 180 DAP, The maximum branches 12.83 was found in V<sub>3</sub> (Miss india, 15th february) and the minimum was recorded in V<sub>1</sub> (Apple ber, 15th march) with 8.67.

At 180 DAP, The maximum plant spread (E-W) 30.08cm found in V<sub>3</sub> (Miss india, 15th february) and the minimum was recorded in V<sub>1</sub> (Apple ber, 15th march) with 24.57cm (E-W).

At 180 DAP, The maximum plant spread (N-S) 32.20cm found in V<sub>3</sub> (Miss india, 15th february) and the minimum was recorded in V<sub>1</sub> (Apple ber, 15th march) with 25.27cm (N-S).

The highest leaf area 18.50cm was found in V<sub>1</sub> (Apple ber, 1st march) and the lowest was recorded in V<sub>3</sub> (Miss india, 15th march) with 8.58cm.

The maximum leaf area 0.035 was found in V<sub>1</sub> (Apple ber, 1st march) and the minimum was recorded in V<sub>3</sub> (Miss india, 15th march) with 0.015.

At 180 DAP, The highest chlorophyll content 35.67 was found in V<sub>1</sub> (Apple ber, 1st march) and minimum was recorded in V<sub>3</sub> (Miss india, 15th march) with 26.83.

At 180 DAP, The maximum survival (survival) (%) 88.89 was found in V<sub>3</sub> (Miss india, 15th february), and the minimum survival (%) was recorded in V<sub>1</sub> (Apple ber, 1st march) with 33.33.

**Table 2: Effect of different planting date on different cv. of ber.**

Treatment symbol	Variety	Plant height(cm)	Bud breaks	No. of leaves
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**Comment [E19]:** What is the relevance of this here. It is the repetition of what is written above. Instead of this you have to start by the ANOVA result and proceed to the mean result.

**Comment [E20]:** Please rewrite this part and organize again to different paragraphs that contain information about each parameter independently. The discussion part is also totally missed. The result and discussion part is totally missed to me. How can you say Result and discussion.

**Comment [E21]:** Please mention the specific parameters indicated below in the table.

T <sub>1</sub>	Apple ber+ (15th february)	59.88	19.83	97.67
T <sub>2</sub>	Kashmiri+ (15th february)	60.30	25.33	108.00
T <sub>3</sub>	Miss india+ (15th february)	62.36	27.67	124.50
T <sub>4</sub>	Apple ber+ (1st march)	61.20	21.33	94.33
T <sub>5</sub>	Kashmiri+ (1st march)	65.73	24.33	113.67
T <sub>6</sub>	Miss india+ (1st march)	60.97	27.17	114.83
T <sub>7</sub>	Apple ber+ (15th march)	51.20	19.00	92.00
T <sub>8</sub>	Kashmiri+ (15th march)	57.33	21.83	104.83
T <sub>9</sub>	Miss india+ (15th march)	55.93	26.67	111.83
<b>F.test</b>		<b>S</b>	<b>S</b>	<b>S</b>
<b>S.E (d) (±)</b>		2.82	1.98	5.92
<b>CD(5%)</b>		5.98	4.21	12.29

**Comment [E22]:** The table should be referred in the result art properly which is totally missed in your case.

**Table 3: Effect of different planting date on different cv.of ber.**

**Comment [E23]:** Please mention the specific parameters by name here

**Comment [E24]:** Not refereed in the main body

Treatment symbol	Variety	No. of branches	Plant spread(cm)	
			East-West	North- South
T <sub>1</sub>	Apple ber+ (15th february)	9.00	28.30	26.77
T <sub>2</sub>	Kashmiri+ (15th february)	10.17	29.50	30.03
T <sub>3</sub>	Miss india+ (15th february)	12.83	30.08	32.20
T <sub>4</sub>	Apple ber+ (1st march)	9.30	27.13	28.37
T <sub>5</sub>	Kashmiri+ (1st march)	10.83	27.30	28.17
T <sub>6</sub>	Miss india+ (1st march)	10.17	28.03	27.40
T <sub>7</sub>	Apple ber+ (15th march)	8.67	24.57	25.27
T <sub>8</sub>	Kashmiri+ (15th march)	9.83	26.33	25.40
T <sub>9</sub>	Miss india+ (15th march)		27.50	26.77

		10.50		
<b>F.test</b>		S	S	S
<b>S.E (d) (±)</b>		0.81	1.07	1.11
<b>CD(5%)</b>		1.73	2.28	2.37

**Table 4: Effect of different planting date on different cv.of be.**

Treatment symbol	Variety	Leaf area(cm)	Leaf area index
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**Comment [E25]:** Please mention the specific parameters here by name and cite the table properly as well

T <sub>1</sub>	Apple ber+ (15th february)	17.83	0.037
T <sub>2</sub>	Kashmiri+ (15th february)	12.33	0.028
T <sub>3</sub>	Miss india+ (15th february)	9.47	0.016
T <sub>4</sub>	Apple ber+ (1st march)	18.50	0.035
T <sub>5</sub>	Kashmiri+ (1st march)	12.83	0.027
T <sub>6</sub>	Miss india+ (1st march)	8.50	0.015
T <sub>7</sub>	Apple ber+ (15th march)	17.67	0.034
T <sub>8</sub>	Kashmiri+ (15th march)	11.50	0.025
T <sub>9</sub>	Miss india+ (15th march)	8.97	0.017
<b>Ftest</b>		<b>S</b>	<b>S</b>
<b>S.E (d) (±)</b>		0.75	0.0028
<b>CD(5%)</b>		1.59	0.0058

**Table 5: Effect of different planting date on different cv. of ber.**

Treatment symbol	Variety	Chlorophyll content	Survival(%)
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**Comment [E26]:** Please mention the specific parameters by name here

T <sub>1</sub>	Apple ber+ (15th february)	34.90	66.67
T <sub>2</sub>	Kashmiri+ (15th february)	30.93	77.78
T <sub>3</sub>	Miss india+ (15th february)	27.17	88.89
T <sub>4</sub>	Apple ber+ (1st march)	35.67	55.57
T <sub>5</sub>	Kashmiri+ (1st march)	30.80	66.67
T <sub>6</sub>	Miss india+ (1st march)	27.23	77.78
T <sub>7</sub>	Apple ber+ (15th march)	34.33	33.33
T <sub>8</sub>	Kashmiri+ (15th march)	29.80	55.57
T <sub>9</sub>	Miss india+ (15th march)	26.83	66.67
<b>F.test</b>		S	S
<b>S.E (d) (±)</b>		2.16	11.47
<b>CD(5%)</b>		4.60	24.20

#### 4. Conclusion

From the present study it can be concluded that (T<sub>3</sub>) treatment on 15<sup>th</sup> february are most suitable date for transplanting and miss India (V<sub>3</sub>) variety is shown significantly superior performance in relation to growth and survival in prayagraj Agro-climatic condition.

**Comment [E27]:** Please made proper conclusion and recommendations which include the combination of the two factors.

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**Comment [E28]:** Where did you cite this list of references? How did I know they are cited or not? Please cite this properly in the main body. If not it is meaning less.