

Effect of Time and Severity of Pruning on Growth, Flowering and Fruiting in Ber (*Ziziphus mauritiana* Lamk.) cv. Umran

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Abstract The study was conducted to know the effect of time and severity of pruning on growth, flowering, fruit setting and fruit retention on ber cv. Umran. The plants were pruned on three dates at the interval of 15 days, i.e. from 15th May to 15th June with five levels of pruning intensities. The shoot length, leaf area, per cent bud sprouting, per cent fruit set and per cent fruit retention differed significantly with various pruning treatments. From the present investigation, it was found that the plant pruned on 30 May at 15 buds, recorded maximum fruit retention per tree.

Key words Shoot growth, Bud sprouting, Fruit set, Fruit retention, Pruning.

The Indian Jujube, commonly known as ber (*Ziziphus mauritiana* Lamk.) is an ancient fruit of India and grown over a large area in the country. The ber plants grow so vigorously that they attain a dense bushy shape, if left unpruned. Fruiting in ber occurs in the axils of the shoots of the current year. Thus, regular pruning is essential to induce a good healthy growth to increase the bearing area. Awasthi and Misra (1969) observed that pruned ber trees maintained normal flowering, increased fruit set and reduced fruit drop, whereas unpruned trees produced more abnormal flowers, reduced fruit set and fruit retention. It was, therefore, thought worthwhile to find out, whether a combination of back pruning with the normal pruning severity could be adopted and, therefore, the present investigation was carried out with the following objectives :

- a) To find out the best time of pruning
- b) To find out the extent of pruning helpful in fruit setting and fruit retention.

Materials and Methods

The investigation was undertaken during the year 1991-92 at the Experimental Orchard of Department of Horticulture, CCS Haryana Agricultural University, Hisar, on the thirteen year old ber trees of cv. Umran planted at a spacing of

8 x 9.5 m. The trees were pruned at fortnightly intervals, i.e., 15 May, 30 May and 15 June, 1991 with the following pruning severities ; T₁- Control (no pruning), T₂- Pruning primary branches to 25 buds, T₃-Pruning primary branches to 15 buds, T₄-Pruning half the primary branches from the base and the remaining half to 25 buds, and T₅- Pruning half the primary branches from the base and the remaining half to 15 buds.

All the secondary branches were removed from the base. A complete randomised design with three replications in each unit was followed. The observations (Table 1) were taken on selected representative branches. The flowers on the selected branches were counted and fruit set recorded when the fertilized ovary attained grain size and the fruit retention was recorded on the basis of total fruit.

Results and Discussion

Effect on shoot growth : The maximum shoot length and shoot diameter were recorded in T₅ on 30 May and the minimum in T₂ on 15 June (Table 1). The values were significantly higher than T₁ which recorded 79.7 cm of shoot length and 0.8 cm of shoot diameter. It is also evident that the shoot length increased significantly with delay in pruning upto 30 May, but with further delay (15 June), it decreased. The various pruning intensities also had

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significant effect on shoot length and diameter. This may be due to the number of total shoots reduced in severely pruned trees which resulted in availability of more reserved food for individual shoot.

Per cent vegetative bud sprouting : The maximum bud sprouting percentage was recorded in T₅ on 15 May and the minimum in T₂ on 15 June. All the combinations showed increased per cent bud sprouting over that in the T₁. In case of pruning time the maximum (56.3%) bud sprouting percentage was recorded in the trees pruned on 15 May and the minimum (53.1%) by pruning on 15 June. It is evident that per cent bud sprouting increased significantly as the pruning severity increased and the maximum (58.6%) recorded in T₅ and the minimum (48.2%) in T₂. This may be because the maximum severity considerably reduced the number of buds left on the branches. So this induced most severe pruning also eliminated the apical dominance. Similar findings were reported by Gupta (1987).

Effect on leaf area : The maximum leaf area was recorded in T₅ on 30 May and the minimum T₁ (21.1 cm²). In case of pruning time treatments, the maximum (24.6 cm²) leaf area recorded by pruning on 30 May and the minimum (22.3 cm²) in the trees pruned on 15 May. Leaf area increased significantly as the pruning severity increased (Table 1). This may be because, vigour of shoots on the severely pruned trees increased which enhanced the metabolites availability to the developing leaf. Similar findings were obtained by Gupta and Godara (1989) and Bisla *et al.* (1990). However, Gupta (1987) recorded maximum leaf area in the trees pruned on 10 June.

Effect on fruit set : It is clear from the Table 1 that all the treatment combinations recorded significantly higher fruit set than the T₁. The maximum fruit set was recorded in T₅ on 30 May followed by 15 May. In case of pruning severity, the maximum fruit set was recorded in T₅ and minimum in T₂. Gupta *et al.* (1990) and Bisla *et al.* (1991) also obtained the highest fruit set in severely pruned Umran ber trees. Singh and Sandhu (1984) recorded highest fruit set by pruning on 30 May, whereas, Gupta *et al.* (1990) by pruning on 15 May. In the present study the trees were in complete dormancy by 30 May and, therefore, more amount of metabolites and nutrients were retained by the shoots after pruning for new flush. Further the fruit set observed to be maximum in severely pruned trees owing to reduced competition between developing fruits for nutrients and thus resulting in reduced fruit drop.

Effect on the fruit retention : Perusal of data (Table 1) show that the maximum fruit retention was recorded in the trees pruned on 30 May which was significantly higher than 15 June. Similarly, the highest fruit retention of 18.5 per cent was observed in T₃ and the minimum (15.7%) in T₅. The higher fruit retention was observed in the medium pruned trees owing to the reduced per cent fruit set in these trees, and the poor fruit setting reduced the competition between developing fruits. Similar results have been obtained by Syamal and Rajput (1989) and Gupta *et al.* (1990).

Effect on bud sprouting period, flowering period and time of fruit set and fruit harvest : It is evident from the Table 2 that the duration of bud sprouting ranged from June 7 to July 12 followed by flowering

Table 2 Effect of time and severity of pruning on time and duration of bud sprouting, flowering and time of fruit set and fruit harvest in ber cv. Umran

Treatments	Bud sprouting period	Flowering period	Time of fruit set	Time of fruit harvest
Time of pruning				
15 May	7 June – 5 July	10 Sept. – 12 Nov.	28 Sept.	22 March
30 May	8 June – 8 July	13 Sept. – 12 Nov.	29 Sept.	23 March
15 June	19 June – 12 July	14 Sept. – 13 Nov.	30 Sept.	25 March
Pruning severity				
T ₁	9 June – 12 July	14 Sept. – 13 Nov.	3 Oct.	25 March
T ₂	8 June – 7 July	10 Sept. – 10 Nov.	27 Sept.	23 March
T ₃	9 June – 6 July	11 Sept. – 12 Nov.	27 Sept.	24 March
T ₄	10 June – 6 July	13 Sept. – 13 Nov.	28 Sept.	25 March
T ₅	10 June – 5 July	14 Sept. – 13 Nov.	28 Sept.	25 March

from September 10 to November 13 and fruit set from September 27 to October 3. The bud sprouting and flowering periods were reduced as a result of pruning treatments. In general, the delay in pruning also delayed bud sprouting, flowering and fruit set which resulted in slight delay in fruit harvest. As the pruning severity increased, the bud sprouting and flowering period reduced, but there was no considerable effect on time of fruit set and fruit harvest. which may be attributed to early bud sprouting. In case of pruning severity, delay in flowering may be due to the increased vigour of the emerging shoots as the pruning severity was increased. Similar findings were recorded by Gupta *et al.* (1990). Dhiman (1987) also observed delay in flowering and fruit harvest by increased severity of pruning.

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