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CAZRI Ber 2018: New early variety of ber

CAZRI Ber 2018 released by ICAR-Central Arid Zone Research Institute (Jodhpur), in 2018, is the earliest variety of ber in North India. It is a high yielder with an average fruit yield of about 61 kg/plant under rainfed condition (300-400 mm). Mean plant height is 2-3 m, spreading growth habit, mean fruit weight-19.26 g, fruit size 3.19cm × 3.13cm (L×W), mature fruit colour-greenish yellow, fruit shape round, pulp, stone ratio 12.33, TSS 18.83°Brix, pulp acidity 0.51%, and vitamin C content is 50.73 mg/100g.

AMONG arid fruits, the ber occupies the most prominent place being one of the hardiest trees adapted for growing under varied agro-climatic conditions. The fruits are rich in carbohydrates, vitamins and minerals and are available at comparatively cheaper rates in the season. It has the ability to grow on marginal lands and is an ideal fruit crop for arid and semi-arid areas. At present, ber is grown in more than 85,000 ha area in the states of Madhya Pradesh, Punjab, Haryana, Rajasthan, Maharashtra, Uttar Pradesh, Andhra Pradesh, West Bengal and Karnataka etc. Once established, it can give production under rainfed condition and considered as insurance against drought which often affects the production of annual *kharif* crops in rainfed areas. Early maturing varieties are important for rainfed areas as they can evade moisture stress at fruit maturity and fetch better price.

CAZRI Ber 2018

CAZRI Ber 2018 is a new high yielding early maturing variety of ber developed by selection from seedling population of var. Gola. The plants are vigorous, spreading type which turn into drooping type at fruit maturity due to heavy fruit bearing. Mean plant height 2-3 m, leaves sparsely tomentose on lower surface, dorsal surface-light green, leaf apex-acute, leaf shape cordate, early maturing, mean fruit weight-19.26 g, fruit size 3.19cm×3.13 cm (L×W), mature fruit colour-greenish yellow, fruit shape round, pulp stone ratio-12.33, TSS-18.83^{0}Brix, pulp acidity-

0.51% and vitamin C is 50.73 mg/100g. This variety has about 25% higher yield than Gola variety under rainfed condition (mean fruit yield-61.25 kg/plant) and fruit maturity earlier than Gola by 10-12 days than var. Gola, the existing early variety. The variety can be recommended for its earliness being important for getting the benefits of higher prices and higher yield even under low rainfall situation. This variety has also been found to perform better under climate change scenario due to early fruit set during September before the rise of post monsoon temperature during October which affects fruit set and causes heavy fruit drop.

Cultivation

The variety can be easily propagated by budding on to the seedling rootstock of *Z. rotundifolia*. The rootstock seedlings are prepared in polythene bags (25cm×10 cm) filled with rooting mixture of sand, clay and organic manure in 6:1:1 ratio. The sowing of the rootstock seeds is done during March-April in north-west India for getting buddable rootstock thickness by June-July. The rootstock seedlings are budded when they are about 90 days old during June-July with I or patch budding method.

Planting

The variety CAZRI Ber 2018 can be planted during June-July in prefilled pits of the size of 2'×2'×2' spaced at 6m×6 m in square system of planting.

Training and pruning

During the initial two years, pruning is required to build strong architecture of branches to bear the load of fruits, while subsequently it needs to be done every year for profitable crops. In the first year, the plants are allowed to grow until the next spring (March) when it is headed back keeping 1-2 basal buds on the scion portion just above the graft union to induce development of vigorous shoots. One upright growing vigorous shoot is retained from the scion bud. The trunk is kept clean up to a height of 30 cm from ground level by removing all side shoots. From the main trunk, 3-4 properly spaced and favorably placed shoots are allowed to grow. After initial training, regular annual pruning is necessary to maintain the productivity and fruit quality. While pruning, the unproductive part of the past season's main shoot and its secondaries as well as weak and diseased branches are removed to obtain healthy growth at most of the productive nodes. The exact time of pruning is location specific and in Rajasthan, it should be done in first fortnight of June.

Water and nutrient management

Ber cultivation can be taken up under rainfed condition after initial establishment with irrigation. During sub-normal rainfall years, *in situ* water harvesting is done by providing 5% slope towards tree trunk and mulching the basin with black polyethylene sheet or straw mulch conserve the moisture. If there is enough rain during July-September, irrigation is not required during this period but it may be done in October to December.

Regular manuring is required to replenish the nutrient used by the tree in vegetative growth and fruit production. About 10 kg FYM per plant should be applied at the time of pit filling which is increased per year with a maximum of 30 kg per plant after five years of age or more. In general, 600 g nitrogen, 250 g potash and 250 g phosphorus per plant per year is applied. Full quantity of FYM, phosphorus and half dose of nitrogen and potash are applied during July and remaining quantity of potash and nitrogen should be applied after fruit set during November. In addition to major nutrients, 2-3 foliar spray of micronutrients such as borax (0.5%), zinc sulphate (0.4%) and ferrous sulphate (0.4%) should be done during august-september for better growth and fruit quality.

Interculture

Weed growth can be kept under control by a combination of mechanical and manual control measures. Ploughing the inter row spaces immediately after pruning during summer exposes the soil to solar radiation which kills hibernating insect pests. The weed population in the inter row spaces is uprooted by mechanical harrowing, while those growing just around the trunk is removed by manual operations.

Disease and insect-pest management

Powdery mildew causes significant losses in humid areas but in north west India, this disease is very rare. The symptoms of the disease appear on leaves, inflorescence as well on newly set fruits. Developing young leaves show whitish powdery mass, which cause them to shrivel and defoliate. The disease can be controlled by spraying Dinocap (0.2%) or 0.1% Kerathane (EC) or 0.2% Sulfex. The spray of chemical should be started soon after appearance of the symptoms and repeated at three weeks interval. Where the disease occurs regularly every year, one prophylactic spray of fungicide should be done during September. Other diseases such as *Alternaria* leaf spot, black leaf spot, *Cercospora* leaf spot, *Cladosporium* leaf spot and rust are also reported but losses due to them are not very significant in adverse conditions of western Rajasthan.

Among the insect pests, fruit fly (*Carpomyia vesuviana*

Costa) is the severe most pest of ber fruits including the variety CAZRI Ber 2018. The infestation starts just after fruit set with the laying of eggs on young fruits when they are tender. This is followed by hatching of eggs and the resultant larvae feed on developing fruits rendering them unfit for consumption. An integrated approach to control the pest involves collection and destruction of infested fruits, deep ploughing during summer and chemicals with two sprays of methyl demeton (0.03% a.i.) or quinalphos (0.05% a.i.) or monocrotophos (0.03% a.i.) once in october or when majority of the fruits attain pea size and second spray after 15-20 days of the first spray. A third spray with 0.1% malathion during december ensures complete freedom from the infestation.

The bark eating caterpillar (*Inderbela quadrinotata* Walke) is another serious pest in arid zone. The appearance of frassy deposits on forks and angles of the branches indicates its presence. The pest makes holes for shelter at the forks and angles of young branches rendering them weak and impedes the food supply. Such branches get detached owing to weight of the fruits and ultimately dry. The insect infestation starts in July-August on emerging tender shoots. The spray of dichlorvos (0.15%) at the base of tender shoots might help to control the infestation to set in. The holes may also be plugged with a cotton swab dipped in kerosine oil or dichlorvos insecticide. The other insect pests of minor importance are chafer beetle, hairy caterpillar; lac insects etc. may inflict some damage occasionally.

Fruit harvesting and yield

Harvesting of the fruits at right stage of maturity is essential to obtain desired organoleptic quality in fruits and for extending the shelf life. The immature fruits are green in colour, which turn greenish yellow upon maturity. The variety CAZRI Gola is earliest to start ripening i.e. last week of December which can continue up to end of January. Harvesting of fruits should be done early in the morning and the fruits be precooled and graded according to size. The fruits should be harvested immediately as the shelf life is low.

The peak fruit production is reached at 8-10 years of planting, which may continue up to 40 years depending upon care and management. Fruit yield varies at different agro-climatic location. The maximum fruit yield in semi-arid sub-tropical north India under rainfed conditions have been recorded up to 100 kg per plant in good rainfall years (500 mm or more). However, long term average of variety CAZRI Ber 2018 is 40-60 kg per plant under rainfed conditions.

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TECHNICAL SPECIFICATIONS

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