

Pusa Khor: A Walnut Cultivar showed the Potentiality of Cluster-bearing Habit

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Abstract: Walnut (*Juglans regia* L.) is one of the most important temperate nuts grown in India. It is grown in Jammu & Kashmir, Arunachal Pradesh, Himachal Pradesh and Uttarakhand under rain fed and poor soil conditions in marginal lands. Jammu & Kashmir accounts for almost 98 per cent of the country's output. Walnut is grown in Himachal Pradesh and Uttarakhand to a limited extent. In Himachal Pradesh, it is grown in a couple of some of the districts. They are not only delicious but also a complete functional food because they not only provide nutritional but also medicinal health benefits. They are unique among nuts because they are loaded with omega -3 fatty acids, and various other bioactive compounds, antioxidants, fibre, vitamins, minerals, and phytosterols and produce a high-quality wood. There is an increasing interest by consumers in eating walnuts. The existing genetic diversity of walnuts in Himachal Pradesh (H.P.), India is very important for walnut breeders. For this reason, our study evaluates the tree characteristics of the walnut cultivar "Pusa Khor" which has been commercialized in H.P. 'Pusa Khor' is a new walnut cultivar with a high number of nuts per cluster. This walnut cultivar showed both lateral and terminal bearing habit. This walnut cultivar has a high estimated yield, with a nut weight of 9 to 16 g and a kernel weight of 3.5 to 7 g. 'Pusa Khor' was selected among a diverse range of genotypes in the Chamba district of Himachal Pradesh, India. The objective of this exploration program was to obtain promising cultivars among seedling populations characterized by important tree habits, nut traits, and resistance to biotic and abiotic stresses.

Keywords: walnut, *Juglans regia*, walnut breeding, cultivars, Pusa Khor, cluster bearing

INTRODUCTION

Walnut (*Juglans regia* L.) is one of the most important temperate nuts grown in India. It is grown in Jammu & Kashmir, Arunachal Pradesh, Himachal Pradesh and Uttarakhand under rain fed and poor soil conditions in marginal lands. Jammu & Kashmir accounts for almost 98 per cent of the country's output. Walnut is grown in Himachal Pradesh and Uttarakhand to a limited extent. In Himachal Pradesh, it is grown in a couple of some of the districts. India needs to bring in additional area under walnut cultivation to meet the projected walnut demand of around 75,000 tonnes by 2020 (Vigneshwara, 2011) which is not yet fulfilled. They have amazing health

benefits. They are not only delicious but also a complete functional food because they not only provide nutritional but also medicinal health benefits. They are unique among nuts because they are loaded with omega -3 fatty acids, and various other bioactive compounds, antioxidants, fibre, vitamins, minerals, and phytosterols and produce a high-quality wood. There is an increasing interest by consumers in eating walnuts. The existing genetic diversity of walnuts in Himachal Pradesh (H.P.), India is very important for walnut breeders. To date, numerous walnut breeding studies have been carried out throughout the world (Akca et al., 2016; Germain, 1990, 1995; Vahdati et al., 2019).

The general objectives of walnut breeding programs in many countries are to provide lateral bearing, late-leaving cultivars with a high yield and a resistance to biotic and abiotic stresses. However, there has been a limited number of studies on the cluster-bearing habit in walnuts (Germain et al., 1997; Rezaee et al., 2006; Sutyemez, 1998; Vahdati et al., 2014). For this reason, our study evaluates the tree characteristics of the walnut cultivar Pusa Khor, which has been commercialized in H.P. 'Pusa Khor' is a new walnut cultivar with a high number of nuts per cluster. This walnut cultivar showed both lateral and terminal bearing habit. This walnut cultivar has a high estimated yield, with a nut weight of 9 to 16 g and a kernel weight of 3.5 to 7 g. 'Pusa Khor' was selected among a diverse range of genotypes in the Chamba district of Himachal Pradesh, India. The objective of this exploration program was to obtain promising cultivars among seedling populations characterized by important tree habits, nut traits, and resistance to biotic and abiotic stresses.

RESULTS AND DISCUSSION

The aim of our research was to provide information on the new walnut cultivar "Pusa Khor". Here the report of phenological and pomological traits according to the walnut descriptor and International Union for the Protection of New Varieties of Plants (UPOV) (Anonymous, 1994, 2015). Data were collected for 5 years of observation (2015–20) on 10 'Pusa Khor' variety. 'Pusa Khor' is an early-season cultivar; its leafing date is about mid of March. In general evaluations, 'Pusa Khor' tends to initiate the growth of leaves before other established cultivars in the season. In comparison with others, 'Pusa Khor' shows an earlier blooming of its male and female flowers. Both types of flowers bloom almost simultaneously (which indicates homogamy). In comparison with others, 'Pusa Khor' shows both terminal as well as lateral bearer. The aim of this article is to emphasize the cluster-bearing habit of 'Pusa Khor' as its most important trait in walnut. The clusters of the female flowers in 'Pusa Khor' can be comprised of up to 25 flowers, leading to a high estimated yield. It varied from 3-25. The abundance of

female flowers in 'Pusa Khor' is heavy, and catkin abundance is intermediate. About 33% of the lateral buds turn out to be fruitful (Table 1).

The shape of the nuts is medium-size ovate. The shell of most nuts is weak, very smooth in texture, and very light in color. The kernel is very easy to remove. The kernels of 'Pusa Khor' are Wheatish yellow in colour. By conducting measurements on 500 nuts during a period of 5 years, it was observed that each nut can weigh 9.45 to 16.09 g, each kernel can weigh 3.5 to 6.92 g, and kernel percentage is 33% to 50% (Table 1). This cultivar is important because the fruitfulness of its cluster-bearing habit that, for this particular type, is comparable to other walnut cultivars. 'Pusa Khor' can also be appreciated for its high fruit yield, which results in part from the existence of 25 flowers per cluster; good fruit quality; and early harvest and defoliation dates (Anonymous. 1994, 2015, 2019).

Table 1. Average phenological and pomological traits of 'Pusa Khor' cultivar during 5 consecutive years.

Characteristics	"PUSA KHOR"
Leafing date	17 Mar.
Harvest date	23 Aug.
Defoliation date	25 Oct.
First male bloom date	16 Mar.
Last male bloom date	12 Apr.
First female bloom date	23 Mar.
Last female bloom date	8 Apr.
Dichogamy	Homogamy
Catkin abundance	Intermediate
Lateral bud flowering (%)	33%
Female flower abundance	Intermediate
Flowers (no. per cluster)	3-25
Fruit set type	Cluster lateral & Terminal
Estimated yield	Medium
Nut shape	Ovate
Shell texture	Smooth
Shell color	Very light
Shell strength	Weak
In-shell nut weight (g)	9.45-16.09
Kernel weight (g)	3.50-6.92
Kernel percentage	33-50
Kernel fill	Well
Ease of removal of kernel halves	Very easy
Kernel color	Wheatish yellow

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