DOI : 10.5958/0974-0112.2017.00115.3

Indian J. Hort. 74(4), December 2017: 601-603

Short communication

Evaluation of genetic diversity of pecan nut [*Carya illinoensis* (Wang) K. Koch.] in Jammu region

Sohnika Rani*, Arti Sharma, V.K. Wali, Kiran Kour, Manish Sharma and Manmohan Sharma

Faculty of Agriculture, Sher-e-Kashmir University of Agricultural Sciences & Technology of Jammu, Chatha 181101, Jammu & Kashmir

ABSTRACT

Pecan is one of the most important deciduous horticultural nut crops and valued for its high calorific value. It is superior to walnut in quality (flavour, 65-70% fats, 8-10% proteins, high in phosphorous, potassium and vitamins A, C, E and B complex) and thrives best in the area experiencing somewhat warmer climate. The present study was carried out during 2015-17 in pecan nut growing areas of Jammu division to assess the extent of genetic divergence and select the superior genotypes of seedling origin pecan nut. Nut weight, kernel weight, nut length, nut width (lateral), nut width (ventral) and shell thickness varied from 3.56-8.63 g, 2.06-6.95 g, 20.03-52.40 mm, 15.50-28.40 mm, 15.54-33.40 mm and 0.30-1.89 mm, respectively. Five out of 60 genotypes were selected on the basis of higher and desired nut and kernel characteristics, which can be further used for trait-specific breeding programmes.

Key words: Genotypes, pecan nut, seedling origin, genetic diversity.

Pecan [*Carya illinoensis* (Wang) K. Koch.] an important edible nut crop, belongs to family Juglandacae. Pecan is one of the most important deciduous horticultural nut crop in the world and is valued nut for high calorific value (~680 calories/100 g kernel). Pecan is superior to walnut in quality (flavour, 65-70% fats, 8-10% proteins, high in phosphorous, potassium and vitamins A, C, E and B complex) and thrives best in the areas, which are considered somewhat lower and hotter for walnut cultivation (Herrera, 2; Sparks, 4; Singh *et al*., 3). In India, its cultivation is limited to mid-hill areas of Himachal Pradesh, Jammu & Kashmir, Uttarakhand and climatically similar areas of North-Eastern states and Nilgiri hills of Tamil Nadu. Its importance lies in nuts having relatively thin shell, which cracks easily and having high nutritional value of the kernel in terms of more than 11 to 12 per cent protein, 70 per cent fat, good amount of phosphoric acid and high calorific value. Pecan nut has been introduced in J&K from Himachal Pradesh by State Horticulture Department. The area under pecan nut in Jammu region is around 464.68 ha with production of about 104.03 metric tonnes in 2015-16. Maximum area under pecan nut is in Rajouri district, *i.e.* 163.0 ha with production of 62.00 MT followed by Poonch having 125.0 ha area under pecan nut with production of 7.50 MT (Anon, 1).

These pecan nut trees raised from seeds being highly heterozygous provide an enormous wealth for carrying out the selection of desirable strains to improve the varietal wealth of pecan. However, still this nut crop could not assume commercial status for the want of suitable cultivars among orchardists due to many constraints such as lack of ideal varieties. Almost all pecan plantations in Jammu division owe their origin to un-descriptive seedlings and are extremely heterogeneous in quality attributes. The existing population comprising the trees of seedling origins exhibit tremendous variability in growth, yield and quality attributes there by providing a platform for exploitation of vast gene pool (Singh *et al.*, 3). Nevertheless, there is huge potential of this nut crop to commercialize being hardy to climatic vagaries and having export value. Meagre efforts have been made for selection of superior seedling pecan genotypes with desirable traits especially economically important nut and kernel traits. To commercialize this nut crop following strategies should be made such as development/ selection of ideal varieties of pecan nut: There is a need to identify suitable trees from native seedling populations or to introduce cultivars from other countries, which are suitable for the different climatic conditions prevailing in the state of Jammu and Kashmir.

Since the seedling pecan plants around Rajouri and Poonch districts of J&K exhibit wide genetic variability expressed through different tree and nut characters, it seems worthwhile to study variations in seedling trees. It appears to be more relevant, in view of the fact that all pecan cultivars introduced

*Corresponding author's E-mail: sohnikaskuastj@gmail.com

Table 1. Range of variability present in nut and kernel characters of pecan nut trees of seedling origin.

Trait	Nut wt. (g)	Kernel wt. (g)	Nut length (mm)	Nut width (lateral) (mm)	Nut width (ventral) (mm)	Shell thickness (mm)	Kernel recovery (%)
Range	3.56-8.63	2.06-6.95	20.03-52.40	15.50-28.40	15.54-33.40	0.30-1.89	40.39-86.55

Table 2. Nut and kernel characters of selected superior genotypes of pecan nut.

Selection/ Trait	SKJPP8	SKJPP13	SKJPM21	SKJPP23	SKJPP25	$CD_{0.05}$
Nut weight (g)	8.63	7.37	8.03	8.05	8.08	0.657
Kernel weight (g)	6.42	6.03	6.95	5.05	6.41	0.078
Nut length (mm)	52.40	39.00	42.40	38.71	48.63	2.113
Nut width (lateral) (mm)	26.25	23.84	28.40	24.77	25.57	1.101
Nut width (ventral) (mm)	32.84	29.98	32.53	30.53	33.40	0.541
Shell thickness (mm)	1.30	1.71	1.55	1.65	1.40	0.051
Kernel recovery (%)	74.39	81.82	86.55	62.73	79.33	1.012

in the country are deficient in one or other trait and there are still better pecan cultivars needs to be selected in pecan growing belts. Thus, the present investigation was carried out in the Division of Fruit Science, FoA, Sher-e-Kashmir University of Agricultural Sciences & Technology of Jammu, Chatha, J&K to study the extent of variability and selection of superior pecan trees from a population of seedling origin in Jammu Division during year 2015-16, and 2016-17. Various locations of Rajouri (33.77°N 74.1°E) and Poonch (33°23′N 74°18′E) districts of Jammu Division, which are at elevation of 915 and 981 m, respectively were surveyed for selecting pecan nut trees of seedling origin. Out of total population 60 seedling origin pecan nut genotypes have been selected based on superior nut and kernel characteristics. The observations on nut and kernel characters were recorded using the pecan nut descriptors given by UPOV so as to estimate the extent of genetic relationship by morphological characterization. The selected genotypes have been named as SKJPP (SKUAST Jammu Pecan nut Poonch), SKJPR (SKUAST Jammu Pecan nut Rajouri) and SKJPM (SKUAST Jammu Pecan nut Miran Sahib) and have been given numbers for the ease of identification. Physical dimensions of nut and kernels were determined using Mitutoyo digital Vernier callipers as per Thompson and Grauke (5). The kernel recovery was worked out as average of 20 randomly selected nuts from each selection using formula: % Kernel recovery = Kernel wt./ Nut wt. × 100.

In all the 60 trees studied, high range of variation was recorded for all horticulturally important traits (Table 1), *viz.*, nut weight (3.56-8.63 g), kernel weight (2.06-6.95 g), nut length (20.03-52.40 mm), nut width (lateral) (15.50-28.40 mm), nut width (ventral) (15.54-33.40 mm), shell thickness (0.30-1.89 mm) and kernel recovery per cent (40.39-86.55).

Out of the 60 pecan nut genotypes, five superior genotypes were selected on the basis of nut and kernel traits. As presented (Table 2), selection SKJPR8 exhibited the maximum nut weight (8.63 g), which was followed by SKJPP25 (8.08 g). The kernel weight was observed maximum in genotype SKJPM21 (6.95 g) followed by SKJPP25 (6.41 g). Genotype SKJPP8 recorded the maximum nut length (52.40 mm) followed by SKJPP25 (48.63 mm), lateral nut width was recorded maximum in genotype SKJPM21 (28.40 mm), which was followed by SKJPP8 (26.25 mm), whereas ventral nut width was observed maximum in genotype SKJPP25 (33.40 mm) followed by SKJPP8 (32.84 mm). The shell thickness was observed minimum in genotype SKJPP8 (1.30 mm) and maximum in SKJPP13 (1.71 mm). Kernel recovery per cent was observed maximum (86.55%) in genotype SKJPM21.

These genotypes having broad genetic base can serve as pertinent genetic sources for initiating trait-specific breeding programmes and have greater potential for commercialization of pecan nut in Jammu Division.

REFERENCES

1. Anonymous, 2016. *Area and Production of different Fruits in Jammu*, Directorate of Horticulture, Jammu, Jammu and Kashmir.

2. Herrera, E.M. 1995. Pecan growing in the western United States. *Hort. Tech.* **5**: 200-01.

3. Singh, D., Gupta, R.K., Singh, M. and Sharma, V.K. 2009. Characterization of pecan (*Carya illinoensis*) germplasm of seedling origin through regression and principal component analysis. *Indian J. Agric. Sci*. **79**: 324-26.

4. Sparks, D. 2000. Pecan in warm climate. **In**: *Temperate Fruit Crops in Warm Climates*, Amnon Erez (Ed.), Kluwer Academic Pub., the Netherlands, pp. 381-403.

5. Thompson, T.E. and Grauke, L.J. 2003. Pecan nut and kernel traits are related to shelling efficiency. *Hort. Sci.* **38**: 586-90.

Received : July, 2017; Revised : October, 2017;
Accepted : November, 2017