

Pollen Biology of cashew nut

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Abstract: Cashew (*Anacardium occidentale* L, Family-Anacardiaceae) is one of the first fruit trees from the new world to be introduced in the old world. Less attention has been given to this point. In recent times, the commercial importance of cashew is gaining momentum. 36 cashew germplasms with 4 anthers have taken for consideration. The significance of the dimorphism in anther size was less obvious, but the large another was more likely to be investigated by insect visitors due to its size and prominence in the flower. It was assumed that rapid lose of pollen viability under ambient conditions was a common phenomenon like other tropical crops.

Key words: Tropical crops, pollen viability, pollen germination, anthesis, pistil, receptivity.

Introduction: Cashew belongs to the family Anacardiaceae, to the genus *Anacardium* and to the species *occidentale*. India is the first country, which initiated a systematic research in the early 1950 and this has been further strengthened in 1970 with the establishment of Central Plantation Crop Research Institute (Kasargod, Kerala). To best of my knowledge little attention has paid to this regard. 50 panicles chosen at random among cashew trees of the germplasms having highest commercial value. The significance of the dimorphism in anther size was less obvious, but the large another was more likely to be investigated by insect visitors due to its size and prominence in the flower. This view was in keeping similarity with different findings. The results indicate that all pollen types showed high fluorescence at '0' hour which declined with increased storage time. It was assumed that rapid lose of pollen viability under ambient conditions was a common phenomenon like other tropical crops.

Review of literature: Less attention has been given to plant-pollinator relationships via male components of a flower's reproductive success. Factors such as pollen production, pollen distribution, floral mechanism & structure, pollinator foraging characteristics and pollen removal are the processes more closely related to pollen dispersal and therefore a flower's male function [I, III].

Material & methods: Experiments were conducted in Regional Research Station of BCKVV at Jhargram as per the methodology proposed by National Research Centre for Cashew at Karnataka during the flowering season of 2014 to 2018. 36 cashew germplasms were considered. From the four types of anthers, four types of pollens are opened. 50 panicles chosen at random among cashew trees of the germplasms having highest commercial value [IV, VI]. It is done with fine nylon & muslin bags; each panicle contains several bisexual flower buds about to open.

- 1) For pollen germination: Prior to dehiscence, anthers from 3 male and 3 bisexual flowers of each germplasms were mounted in FDA-50.
- 2) For pollen viability: Pollen Samples were stored at 20° C and 40% humidity for 0,12,24,48 hours after anther dehiscence and were then tested for viability with FDA.
- 3) For pollen grain size: Mature anther (stored at 20°C and 40% humidity) is examined with distilled water, acetocarmine (1%), glycerin (4%) and in dry condition.

4) For pollen vigour: Ten emasculated bisexual flower of 5 panicles were hand pollinated at anthesis. The pollinated flowers were harvested after 48 hours and the pistils were fixed in Canroy's Fluid ^{III, IV}.

Results: Pollen number of bisexual flower was presented in the Table – 1. It indicates that pollen of bisexual flower is maximum in size. Table – 2 indicates that small anthers of male flower have the highest no of pollens. From Table -3 it is clear that high fluorescence was noticed at '0' hour which declined with increased storage time. Size of different types of pollen was presented in the Table – 4. It indicates that pollens of male large flower were of maximum size in all the medium. From Table – 5, it may be concluded that stigma receptivity was maximum on the day of opening of flower. Pollen area of bisexual small flowers was noticed (Table - 6).

Discussion – The significance of the dimorphism in anther size was less obvious, but the large another was more likely to be investigated by insect visitors due to its size and prominence in the flower. This view was in keeping similarity with different findings. The results indicate that all pollen types showed high fluorescence at '0' hour which declined with increased storage time. It was assumed that rapid lose of pollen viability under ambient conditions was a common phenomenon like other tropical crops. The pollen size gradually decreased in the glycerin, acetocarmine and water medium. Moreover there was a good and high effect at all levels of the pistil. There were also good interactions of female parent and pollen type at all levels of the pistil and female parent and male parent in the stigma, upper style and lower style. Besides, no variation in structure is noticed within the pollen types. The optimum period of receptivity was at 12 noon on the day of anthesis ^[VII, VIII, IX, X].

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Characters Germplasms	Pollens of large anthers of bisexual flower (HL)	Pollen of small anther of bisexual flowers (HS)	Pollen of small anther of bisexual flower
MMA	1013.97	155.83	1394.77

Table-1: Pollen number of bisexual flower

Characters Germplasms	Pollens of large anthers of male flower (ML)	Pollen of small anther of male flowers (MS)	Pollen of small anther of male flower
MMA	789.60	167.07	1443.93

Table-2: Pollen number of Male Flower.

Time (hour)	Pollen type					
	HL	HS	ML	MS	MEAN	SE(M)+
0	99.2	86.7	99.5	92.8	94.55	3.039
6	75.1	41.9	74.6	59.5	62.775	7.843
24	79.7	43.5	36.8	39.3	49.825	10.054
48	35.7	29.3	11.6	11.7	22.075	6.159
Mean	72.425	50.35	55.625	50.825	-	-
SE(M)+	13.31	12.526	19.531	17.08	-	-

Table-3: Pollen viability of the Flower of the germplasm MMA.

Medium	Pollen type					
	HL(M)	HS(M)	ML(M)	MS(M)	MEAN	SE(M)±
Water –	30.12	29.07	32.81	29.47	30.368	0.842
Acetocarmine	30.89	30.05	33.08	30.81	31.21	0.652
Glycerin	38.98	37.91	40.89	38.72	39.102	0.633
Dry	41.67	40.67	44.15	41.14	41.97	0.775

Table-4: Pollen Size in different medium of the germplasm MMA .

Name of Germplasm	No of Flower bud undertaken	1 day prior to opening of flower (%)	On the day of opening of flower (%)	One day after opening of flowers (%)	2 day after opening of flower (%)
MMA	50	20	79	48	27

Table-5: Receptivity of Stigma

SL NO	Pollen Type	Length(MM)	Breadth (MM)	Area(MM&MM)
1	HL	42.6	24.1	1026.66
2	HS	43.2	25.3	1092.96
3	ML	43.5	24.7	1074.45
4	MS	42.1	26.1	1028.28

Table-6: Area of Pollen grains of the germplasm MMA.