# STUDY OF PATH COEFFICIENT ANALYSIS IN SEVENTY-FIVE PROMISING GERMPLASMS OF CASHEW NUT (*ANACARDIUM OCCIDENT ALE*, L.) IN JHARGRAM, WB.

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**Abstract:**Cashew kernels are actually the kidney-shaped seeds that adhere to the bottom of the cashew apple, the fruit of the cashew tree, which is native to the coastal areas of north eastern Brazil. Statistical analysis in cashew revealed that the genotypes showed significant variation with respect to all traits[VI,IX] . The aim of this study was to understand the causal effect / factor of the correlations among 16 breeding traits of 75 cashew germplasms. The trait named kernel weight was considered as the dependent variable for path analysis. The study reveals that in that the trait kernel weights have the highest positive direct effect at genotypic level. With the trait nut weight, shelling % & it was negative for the trait named no of total flowers & anthesis. At phenotypic level , it was positive & maximum for the traits named nut weight, shelling % & it was negative for the traits like duration of flowering, plant girth etc[V,X] .

**Key words:** Path analysis, germplasms, cashew nut, genotypic, phenotypic, abnormal flowers, fruit retention, shelling %, anthesis & anther dehiscence.

**Introduction:** Cashew (*Anacardium occidentale* L), family Anacardiaceae was commercially cultivated in the tropical areas for its high nutritional value of its kernel. In global trade, cashew kernels worth US $5500 million dollars are traded, while at the consumer level the value has been estimated to be US $ 1000 million dollars [VII, IX]. In India the cashew kernel is considered especially for its high Vitamin -E and protein content. So the present study was undertaken for further improvement of this characters by modern statistical analysis .In an effective breeding program me for developing the improvement of germplasms, preliminary information on the nature and magnitude of variation was required in the available materials & association of traits with yield & among themselves. Further, the study of simple correlations did not provide an exact picture of relative importance of direct influence of each of the component traits toward the desired character [I,X]. Keeping this in view, the present investigation was planned in order to understand the causal effect / factor of the correlations among 16 breeding traits of 75 cashew germplasms. The trait named kernel weight was considered as the dependent variable for path analysis.

**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 2010 to 2016. The experimental materials comprised of 75 genotypes were maintained at the Regional Research Station, Jhargram. The biometrical analysis was done by following the methods [IV.V, VI VII].

**Observations:** Analysis at genotypic level (Table - 1), revealed that the trait named nut weight contributes maximum & direct positive coefficient towards kernel weight. This was followed by shelling %. Maximum & direct negative value was observed for the trait named number of total flowers, followed by the trait named anthesis. Analysis at phenotypic level (Table: 2) indicates that the trait named nut weight depicted maximum positive direct effect on kernel weight followed by shelling %. But the trait flowering duration shows highest direct negative effect on kernel weight followed by apple weight [II, III, and VII].

**Discussion:** The estimation of path coefficient analysis at both genotypic & phenotypic level of kernel weight was established. It revealed the fact that the trait kernel weights have the highest positive direct effect at genotypic level. With the trait nut weight, shelling % & it was negative for the trait named no of total flowers & anthesis. At phenotypic level , it was positive & maximum for the traits named nut weight, shelling % & it was negative for the traits like duration of flowering, plant girth etc. The residual effect is optimum that indicates the moderate effect of the trait. This variation is probably is due to intermating of the cashew plants. Similar observations have also been recorded [I, II, III, and IV]

**Conclusion:** The kernel weight had the highest positive direct effect at genotypic level with the trait named nut weight & had the negative effect with the number of total flower. Based on this result it can be concluded that germplasms can be selected as the promising one [VI,IX].

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## Table: 1. Genotypic path coefficients of morphological traits for direct (bold words) & indirect effects on kernel weight.

| **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | **J** | **K** | **L** | **M** | **N** | **O** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **P** | | | | | | | | | | | | | |
| **A** | 0.007 | -0.004 | 0.000 | 0.030 | 0.006 | 0.005 | -0.041 | 0.074 | -0.003 | -0.002 | -0.001 | -0.001 | 0.000 | 0.114 |
| | 0.005 | -0.005 | | | | | | | | | | | | |
| **B** | 0.002 | -0.012 | 0.000 | 0.033 | -0.008 | 0.021 | -0.039 | 0.371 | 0.001 | -0.007 | 0.000 | -0.001 | -0.002 | 0.046 |
| | 0.001 | -0.001 | | | | | | | | | | | | |
| **C** | 0.002 | -0.002 | 0.001 | 0.071 | 0.007 | 0.035 | -0.103 | 0262 | -0.007 | -0.001 | -0.001 | -0.001 | -0.003 | - |
| 0.237 | 0.001 | -0.001 | | | | | | | | | | | | |
| **D** | 0.001 | -0.003 | 0.000 | 0.144 | 0.011 | 0.077 | -0.207 | 0.439 | -0.011 | -0.005 | 0.003 | -0.001 | -0.010 | - |
| 0.183 | 0.003 | -0.005 | | | | | | | | | | | | |
| **E** | 0.001 | 0.002 | 0.000 | 0.038 | 0.040 | 0.047 | -0.106 | -0.090 | -0.003 | 0.005 | 0.001 | 0.000 | -0.007 | - |
| 0.122 | 0.001 | -0.002 | | | | | | | | | | | | |
| **F** | 0.000 | -0.002 | 0.000 | 0.107 | 0.018 | 0.103 | -0.189 | 0.337 | -0.006 | -0.003 | 0.003 | 0.000 | -0.013 | - |
| 0.176 | 0.008 | -0.010 | | | | | | | | | | | | |
| **G** | 0.001 | -0.002 | 0.000 | 0.138 | 0.019 | 0.090 | -0.216 | 0.387 | -0.010 | -0.003 | 0.003 | -0.001 | -0.012 | - |
| 0.201 | 0.004 | -0.007 | | | | | | | | | | | | |
| **H** | 0.001 | -0.005 | 0.000 | 0.071 | -0.004 | 0.039 | -0.093 | 0.897 | -0.005 | -0.010 | 0.003 | 0.000 | -0.006 | - |
| 0.221 | -0.001 | 0.002 | | | | | | | | | | | | |
| **I** | 0.001 | 0.001 | 0.000 | 0.070 | 0.006 | 0.027 | -0.096 | 0.213 | -0.022 | -0.002 | 0.001 | 0.000 | -0.004 | - |
| 0.049 | 0.001 | -0.002 | | | | | | | | | | | | |
| **J** | 0.001 | -0.005 | 0.000 | 0.044 | -0.013 | 0.022 | -0.046 | 0.585 | -0.003 | -0.015 | 0.003 | 0.000 | -0.004 | - |
| 0.031 | 0.004 | -0.001 | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **K** | 0.000 | 0.000 | 0.000 | -0.034 | -0.002 | -0.023 | 0.051 | -0.212 | 0.002 | 0.004 | -0.013 | 0.000 | 0.011 | -0.065 |
| | -0.003 | 0.004 | | | | | | | | | | | | |
| **L** | -0.003 | 0.003 | 0.000 | -0.034 | -0.001 | -0.017 | 0.046 | -0.142 | -0.001 | 0.002 | -0.001 | 0.003 | 0.003 | 0.013 |
| | -0.005 | 0.006 | | | | | | | | | | | | |
| **M** | 0.000 | 0.001 | 0.000 | -0.093 | -0.018 | -0.084 | 0.163 | -0.362 | 0.006 | 0.004 | -0.009 | 0.001 | 0.016 | 0.110 |
| | -0.005 | 0.007 | | | | | | | | | | | | |
| **N** | 0.001 | -0.001 | 0.000 | -0.034 | -0.016 | -0.023 | 0.056 | -0.255 | 0.001 | 0.001 | 0.001 | 0.000 | 0.002 | 0.777 |
| | 0.009 | -0.008 | | | | | | | | | | | | |
| **O** | -0.001 | 0.001 | 0.000 | -0.015 | -0.001 | -0.027 | 0.032 | 0.025 | 0.001 | 0.002 | -0.001 | 0.001 | 0.003 | -0.230 |
| | -0.029 | 0.030 | | | | | | | | | | | | |
| **P** | -0.001 | 0.000 | 0.000 | -0.023 | -0.003 | -0.032 | -0.044 | 0.054 | 0.002 | 0.001 | -0.002 | 0.001 | 0.003 | -0.186 |
| | -0.027 | 0.032 | | | | | | | | | | | | |

A=PLANT HEIGHT. G=TOTAL FLOWER NO. M= POLLINATION INDEX E=ABNORMAL FLOWER NO.

B=PLANT GIRTH. H=NUT WEIGHT. N= SHELLING F=PERFECT FLOWER NO.

C=LEAF AREA. I=. FLOWERING DURATION. O= ANTHESIS. L= FRUIT RETENED.

D=MALE FLOWER NO/PANICLE. J=APPLE WEIGHT. P= ANTHER DEHISCENCE K= FRUIT SET. %.

**Table: 2. Phenotypic path coefficients of morphological traits for direct (bold words) & indirect effects on kernel weight.**

| | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | **J** | **K** | **L** | **M** | **N** | **O** | **P** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **A** | 0.005 | -0.004 | 0.001 | -0.001 | 0.001 | 0.002 | -0.002 | 0.073 | -0.004 | -0.001 | 0.000 | -0.003 | 0.000 | 0.113 | 0.002 | -0.002 |
| **B** | 0.001 | -0.012 | 0.000 | -0.001 | -0.001 | 0.009 | -0.002 | 0.331 | 0.001 | -0.005 | 0.000 | -0.001 | -0.001 | 0.042 | 0.000 | 0.000 |
| **C** | 0.001 | -0.001 | 0.004 | -0.001 | 0.001 | 0.016 | -0.004 | 0.257 | -0.007 | -0.001 | 0.000 | -0.002 | -0.003 | 0.233 | 0.000 | 0.000 |
| **D** | 0.001 | -0.002 | 0.002 | -0.003 | 0.001 | 0.034 | -0.009 | 0.431 | -0.012 | -0.004 | 0.002 | -0.001 | -0.009 | 0.181 | 0.001 | -0.002 |
| **E** | 0.001 | 0.002 | 0.001 | 0.001 | 0.005 | 0.020 | -0.004 | -0.085 | -0.003 | 0.004 | 0.000 | 0.000 | -0.006 | 0.121 | 0.000 | -0.001 |
| **F** | 0.000 | -0.002 | 0.001 | -0.002 | 0.002 | 0.047 | -0.008 | 0.324 | -0.006 | -0.002 | 0.002 | -0.001 | -0.011 | 0.167 | 0.002 | -0.004 |
| **G** | 0.001 | -0.002 | 0.002 | -0.003 | 0.003 | 0.040 | -0.009 | 0.380 | -0.011 | -0.002 | 0.002 | -0.001 | -0.010 | 0.198 | 0.001 | -0.003 |
| **H** | 0.000 | -0.004 | 0.001 | -0.001 | -0.001 | 0.017 | -0.004 | 0.0882 | -0.006 | -0.008 | 0.002 | -0.001 | -0.005 | 0.221 | 0.000 | 0.001 |
| **I** | 0.001 | 0.000 | 0.001 | -0.001 | 0.001 | 0.012 | -0.004 | 0.202 | -0.025 | -0.002 | 0.001 | 0.000 | -0.003 | 0.055 | 0.000 | -0.001 |
| **J** | 0.001 | -0.005 | 0.000 | -0.001 | -0.002 | 0.010 | -0.002 | 0.573 | -0.004 | -0.012 | 0.002 | -0.001 | -0.003 | 0.030 | 0.001 | -0.001 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **K** | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | -0.009 | 0.002 | -0.193 | 0.002 | 0.003 | -0.009 | 0.001 | 0.010 | -0.051 |
| | -0.001 | 0.002 | | | | | | | | | | | | |
| **L** | -0.002 | 0.002 | -0.001 | 0.001 | 0.000 | -0.006 | 0.002 | -0.113 | -0.001 | 0.001 | -0.001 | 0.007 | 0.003 | |
| | 0.026 | -0.001 | 0.002 | | | | | | | | | | | |
| **M** | 0.000 | 0.001 | -0.001 | 0.002 | -0.002 | -0.037 | 0.007 | -0.342 | 0.006 | 0.003 | -0.006 | 0.001 | 0.014 | |
| | 0.106 | -0.002 | 0.003 | | | | | | | | | | | |
| **N** | 0.001 | -0.001 | -0.001 | 0.001 | -0.001 | -0.010 | 0.002 | -0.246 | 0.002 | 0.000 | 0.001 | 0.000 | 0.002 | |
| | 0.790 | 0.003 | -0.003 | | | | | | | | | | | |
| **O** | -0.001 | 0.000 | 0.000 | 0.000 | 0.000 | -0.012 | 0.001 | 0.023 | 0.001 | 0.001 | -0.001 | 0.001 | 0.002 | -0.219 |
| | -0.010 | 0.013 | | | | | | | | | | | | |
| **P** | -0.001 | 0.000 | 0.000 | 0.000 | 0.000 | -0.014 | 0.002 | 0.051 | 0.002 | 0.000 | -0.001 | 0.001 | 0.003 | -0.176 |
| | -0.009 | 0.014 | | | | | | | | | | | | |

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