SEED SETTING UNDER CONTROLLED NATURAL CROSS POLLINATION IN THREE POPULATIONS OF COCONUT *(Cocas nucifera* L.)

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ABSTRACT

The purpose of this study was for high rate production of coconut natural hybrids resulting from controlled natural pollination. The primary objective of this study was to evaluate the seed setting percentage resulting from controlled natural pollination in various cross combinations of coconut *(Cocos nucifera L.)*. A secondary objective was to estimate the effect of climatic factors on number of bunches, number of buttons and number of nuts produced by the cross combinations.

Four coconut types: West African Tall (WAT), Malayan Green Dwarf (MGD), Malayan Yellow Dwarf (MYD) and Malayan Red Dwarf (MRD) were planted in 1987 in an isolated coconut seed garden in Field 42 of the main station of the Nigerian Institute for Oil Palm Research (NIFOR) near Benin-City. The goal was to produce different types of Dwarf (D) x Tall (T) hybrids through open pollination. The male flowers of the selected dwarf mother palms were emasculated, while the male flowers of the tall mother palms were not, allowing the tall palms to cross pollinate the emasculated dwarf palms. Controlled natural pollination of these selected dwarf mother palms was carried out for four years (1997-2000) and seed setting percentage (S%) was recorded during the period. The various cross combinations (populations) studied were MGD x WAT (population 1), MYD x WAT (population 2), and MRD x WAT (population 3). Data collected included number of bunches (NOB), number of buttons (NOBT) and number of nuts (NON). The relationship between climatic factors and NOB, NOBT, NON and S% in the various populations was evaluated using correlation and regression techniques. The climatic Factors included, temperature, rainfall. relative humidity, solar- radiation and sunshine hours.

Data were subjected to the analysis of variance (ANOVA) for a complete randomized design. The Least Significant Difference (LSD) was used for separation of means of traits that had significant F-test. Data on S% were subjected to aresine transformation before analysis. Analysis of variance showed significant mean squares for palms and years for NOB. NOBT, NON and S%(p< 0.01).The mean S% for the four years of investigation was 51.4%, with a range of 48.2-54.3%. Maximum S% was 54.3% in population 3, 51.7% in population 1 and 48.2% in population 2. Broadsense heritability for the four traits ranged from a low value of $3.02^{0}/_{o}$ for NON in population I to a fairly moderate value of 56.22% for NOB in population 2. Statistically significant positive correlation coefficients of 0.85, 0.80, 0.72, 0.71, 0.06 and 0.04 occurred between NOB vs NOBT, NOBT vs NON, NOB vs NON, NON vs S%, NOB vs S% and NOBT vs S% at 0.05 and 0.01 level of probability respectively. The climatic factors were correlated with NOB, NOBT. NON and S%. Amongst the live climatic factors, only rainfall and sunshine hours were significantly correlated (-0.96 and -0.96) with seed setting percentage. Coefficients of determination (R^2) of rainfall, temperature, relative humidity, sunshine hours and solar radiation investigated on the seed setting percentage across populations were 54%, 44%, 5 8 % , 64% and 74%, respectively.

In conclusion, controlled natural cross- pollination method was effective in the production of high D x T hybrid seed setting in coconut palms.