

# **Genetic and Environmental Analysis of Vegetative and Yield Traits in the Oil Palm ( *Elaeis Sp.*).**

Opeke, Bolanle olufunmilayo

Ph.D Plant Science

Department of Plant Science  
Obafemi Awolowo University, Ile Ife, Nigeria

1986.

## **Abstract:**

A total of 21 hybrids of oil palm consisting of four Elaeis guineensis palms selected for shortness, three F<sub>1</sub> interspecific hybrids (Elaeis oleifera x E. guineensis), 13 hybrids from the first backcross generation (BC<sub>1</sub>) of the F<sub>1</sub> interspecific hybrid crossed to E. guineensis and a standard cross used as check, were evaluated for yield and vegetative traits with a view to determining a suitable breeding method for short-stemmed palms. Associations among all traits were also investigated. Furthermore, the effects of climatic factors on vegetative and yield traits were investigated using correlations, stepwise multiple regression and path coefficient analyses. In addition, two environmental indices (biological and biophysical) were compared for yield stability using nine Dura (D) x Tenera (T) hybrids. Data for evaluation were collected from three field plantings made at the Nigerian Institute for Oil Palm Research near Benin City, between 1960 and 1969; and data collected covered the period 1963 to 1982. Generally, the backcross hybrids were superior in cumulative trunk height and annual trunk increment compared to E. guineensis palms selected for shortness, the F<sub>1</sub> interspecific hybrids and the check. However, average yield (as measured by fresh fruit bunch yield) of the backcross hybrids was 22.8-48.2% lower than the mean of the F<sub>1</sub> interspecific hybrids.

Number of bunches and mean bunch weight were associated with vigor characteristics (trunk height, crown diameter and number of leaves) in the backcross hybrids. Total sunshine hours and minimum relative humidity at about 18-21 months before harvest demonstrated the strongest associations with number of bunches and fresh fruit bunch yield. Generally, progenies maintained their relative ranking for environmental response regardless of the index used to quantify the environment.

**Keywords:** yield trait/ vegetative trait/ traits/ hybrids

**Supervisor:** M. A. B Fakorede

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