CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

This study consisted of two parts; first part was on univariate analysis and correlation studies to know the extent of variation in the MPOB-Nigerian oil palm germplasm and association between traits. Secondly, two multivariate techniques via; principal component analysis (PCA) and clustering analysis (CA) were used to study the pattern of variation and classify the oil palm germplasm based on similarity. Both the univariate and multivariate analysis of the agro-morphological traits as well as fatty acid traits revealed clearly the existence of wide variation among the oil palm germplasm and both techniques corroborate each other. Moreover, these variations are well dispersed under the various characters studied. For each and every character, these variations encountered could be exploited in addition to the other traits that have been used for improvement in the MPOB-Nigerian oil palm materials.

The close association among the traits is an important part of the foundation of any breeding programme as it provides an opportunity for the selection of genotypes having desirable traits simultaneously. Also in this study, the positive correlations among yield contributing traits suggest that these characters are important for direct selection of high yielding palms. The multivariate techniques used to study the genetic variability in this study also revealed a wide range of genetic diversity.

The findings of this study suggest that the important characters responsible for the major diversity in the MPOB-Nigerian oil palm germplasm as revealed by the first PC of all the characters pooled together are FFB, BNO, ABW, MFW, MF, KF, SF, ODM,

OB, KB, OY, KY, TEP, OB, KB, OY, KY, TEP, FP, PCS, RL, LL, LW, LN, HT, LA, LAI, BDM, VDM, TDM, *e* and *f*. Also, none of the fatty acid traits were loaded on PC1. However, the results of PCA on the fatty acid traits showed that all the traits were discriminating on PC1 with the exception of palmitoleic acid (C16:1) and linoleic acid (C18:2).

Similarly, the 43 populations clustered for high means of various traits could be exploited for further improvement in characters either through selection or hybridization and the clusters having mean values for yield could be selected for high yielding palms as well. The results from PCA and cluster analysis also complemented each other and from the clustering results, promising germplasm materials like NGA 12, NGA 13, NGA 14, NGA 15, NGA 16, NGA 17, NGA 18, NGA 19, NGA 26, NGA 34, NGA 43, NGA 44 and NGA 45 could be used as reservoir of beneficial gene pool in developing high yielding varieties. Furthermore, for palms with good oil quality, materials like NGA 02 and 19 are the best choice. To achieve a wide array of variation among the oil palm populations, oil palm populations with having high means for desired traits could be hybridized with the low yielding groups (NGA 38, 40, 41 and 42).

Finally, it can be observed from this study that the MPOB-Nigerian oil palm germplasm materials offer a valuable gene pool for utilization in further use in future breeding programme. The evaluation of these materials will assist researchers, breeders and farmers to choose the desirable traits and elite palms for utilization in breeding aims. Further studies could also exploit other chemometric techniques such as discriminant analysis, factor analysis, multiple linear regression, SIMCA, canonical correlation, etc.