CHAPTER 6

CONCLUSION

The experiment on the natural population structure of oil palm from Senegal has shown that there were consistent genetic differences between populations and progenies for all the characters. Analysis of variance (ANOVA) of nine populations showed significant variation for all of the traits studied except for kernel to fruit (K/F), kernel to bunch (K/B) and leaf area ratio (LAR). The knowledge of the performance and genetic structure of the natural populations allow the breeders to exploit the variation for future prospection. In the case of Senegal, all the traits except for K/F, K/B and LAR can be exploited and further prospection can be carried out by collecting samples in different sites.

Analysis of variance (ANOVA) of the 14 progenies showed that genetic variation for most of the traits in Senegal were highly significant ($P \leq 0.01$) indicating there is great genetic variability among the traits. Heritability estimates for bunch yield and its components were average, with h^2_B of 40-60%. As for bunch quality components, most of the heritability estimates were low to average ($h^2_B < 50\%$), the lowest MF with h^2_B of 10% and the highest was oil yield (OY) with h^2_B of 46%. For vegetative traits, heritability estimates were average ($h^2_B < 65\%$) except for frond production (FP) with the lowest h^2_B of 12%. Generally, physiological traits had high heritability values with h^2_B of 40-60%.

The magnitude of progenies variance component (σ^2g) was higher than population variance component (σ^2p). In terms of their proportionate contribution to the total phenotypic variation, neither the population variance component nor progenies variance component can be regarded as major source of the phenotypic variation. The differences within the palms (σ^2w) in general have a higher proportion of the total phenotypic variation. These results suggested that it would be possible to reduce the number of populations in the collection expedition for future prospection.

In the case of Senegal, the magnitude of progenies variance component (σ^2g) was higher than population variance components (σ^2p) suggesting choosing the best palms from the best progenies is essential.

Broad-sense heritabilities were estimated for traits such as FFB (56%), BNO (42%), O/DM (48%), O/WM (40%), OY (46%), KY (44%), PCS (44%), RL (66%), HT (64%), BDM (54%) and BI (56%). These traits can be exploited for further breeding. Palms from populations SEN 02 and SEN 05 performed the best among all populations. The palms from these populations could also have the potential to develop planting materials for drought tolerance as Senegal has low rainfalls. Further studies on breeding and improvement can be carried out for the selected traits from Senegal for drought tolerance, comparing the stomata activity in the leaves between the Senegal germplasm, other germplasm materials and D×P materials and study the Senegal germplasm at molecular level.