

CHAPTER 9

CONCLUSION

Insufficient evidence is available from the population structure of either tree species studied to indicate that elephant have had an effect on structuring the populations. The forces acting on the populations to determine this structure are not the same in the two species. There is overwhelming evidence to indicate that elephant do utilise the trees as a source of nourishment. This however is well known, but of greater relevance is the effect of this utilisation on the tree populations.

The utilisation of both tree species generally differs in the two study sections, mainly as a result of the older utilisation which is due to elephant only being present to the south of the Luvuvhu River for a number of years. The southern trees have therefore been utilised for a longer period and bear scars as evidence of this. Recently however, utilisation has been more intense in the north, a result of the increased elephant numbers in the area. Elephants are feeding on and injuring the trees, but do not appear to be affecting the long term survival of either the *Sterculia rogersii* or *Adansonia digitata* population. There is a possibility that utilisation lowers the resistance of trees to stress inducing factors such as drought, but this could not be determined in the time available for this study. Other than this, no evidence could be found to suggest that elephant are causing mortality of either tree species in the Kruger National Park. The death of baobabs is most likely due to a lack of soil water or simply extreme old age taking its toll (Pearce *et al.* 1994). The perception that increasing numbers of baobabs have perished in recent times is probably a result of the dry 1980s and early 1990s. A pertinent comment made by a Zimbabwean when questioned about the death of baobabs in that area was “it’s not only the trees which are dying; people are dying of starvation and so are our livestock” (Pearce *et al.* 1994). During 1997, sooty mould was present on a number of baobabs in the study area. This syndrome is a manifestation of systemic stress related to lengthy periods of below average rainfall (Pearce *et al.* 1994), which lends further weight to the theory that drought and not elephant utilisation is currently the main cause of death of baobabs in the Kruger National Park.

It is risky to base conclusions about vegetation dynamics on single locations and short-term periods. It is also risky to base the management of protected areas in Africa on observations over short-term periods or single locations only (Prins & Van der Jeugd 1993). The impact of this utilisation therefore needs to be determined by means of a study over a number of years. It is recommended that a long-term monitoring programme is implemented in order to determine the correct management strategy regarding the utilisation of *Sterculia rogersii* and *Adansonia digitata* by elephant.

Long term monitoring is necessary to evaluate the impact of elephants and ensure correct management (Hoft & Hoft 1995; Kabigumila 1993; Tchamba 1995). Further research could most profitably concentrate on obtaining a better understanding of the conditions necessary for pollination and viable seed production by these two tree species. The conditions necessary for regeneration of baobabs and common star-chestnuts as well as the effect of other herbivores, fire and changes in climate on the tree populations could also be investigated further. This knowledge will also assist in isolating factors which may threaten the survival of these tree species in the Kruger National Park.

A long term monitoring programme should include trees of all ages from the full range of habitats. Although trees should be selected for monitoring which are easily accessible, care should be taken to ensure that these trees are representative of the entire population. If all monitoring takes place too close to roads, the data may be affected by the apparent affinity of elephant to use roads as routes of movement (Coetzee *et al.* 1979; Van Wyk & Fairall 1969). Similarly, the distance of trees from water needs to be taken into consideration as the utilisation of woody material has been shown to be higher close to watering points. Provision should also be made to allow for the incorporation of seedlings into the monitoring programme. Without this, no new information on regeneration can be gleaned and the monitored populations will simply appear to be ageing and will eventually die out.