

## CHAPTER 6

### AGE OF ELEPHANT UTILISATION OF *ADANSONIA DIGITATA* AND *STERCULIA ROGERSII* IN THE KRUGER NATIONAL PARK

#### INTRODUCTION

Due to the age which trees can attain, they often bear scars from incidents which may have injured them hundreds of years previously. Baobabs have long been a popular target for vandals, who often carved names and dates on them. In some instances these inscriptions have remained on the trees for many years. Inscriptions carved by sailors on trees on the Magdalene Islands in the 15<sup>th</sup> and 16<sup>th</sup> centuries were still present when Adanson travelled there in 1749 (Wickens 1982). In the Kruger National Park, a number of trees have been defaced, but one of the more famous inscriptions was made by a hunter named Briscoe, who in 1890 carved his name and the year on the tree. This inscription is still visible more than 100 years later. Similarly, and of relevance to this study are the scars left on trees by browsing animals which, are also still visible a number of years later and can provide an indication of the history of utilisation of each tree.

This part of the study was intended to compare the amount of utilisation of the two plant species in the two study sections over time. It was intended that the utilisation over different periods could be compared with past elephant densities to evaluate trends in the utilisation of these tree species by elephant. If elephants had been consistent in their diet, signs of new and old elephant feeding damage would be associated (Ben-Shahar 1993).

#### METHODS

Damage to trees was classified into four age categories based on the colour and texture of the damaged plant tissue. This damage was distinguished in the field, as bark and branches which had been damaged recently were a bright yellow colour. With age, this faded and

became greyish and later white as a result of extended exposure of the inner plant parts to sun and rain (Ben-Shahar 1993; Engelbrecht 1979; Kabigumila 1993). Four age categories were identified and trees were classified according to the following criteria:

- A: The damaged parts of these trees were a deep orange-yellow colour.
- B: The colour of the damaged parts had faded, but was still yellow.
- C: Damaged areas were greyish-white in colour and new bark was beginning to form.
- D: A new layer of bark had completely covered the damaged parts of these trees and damage was only indicated by scars

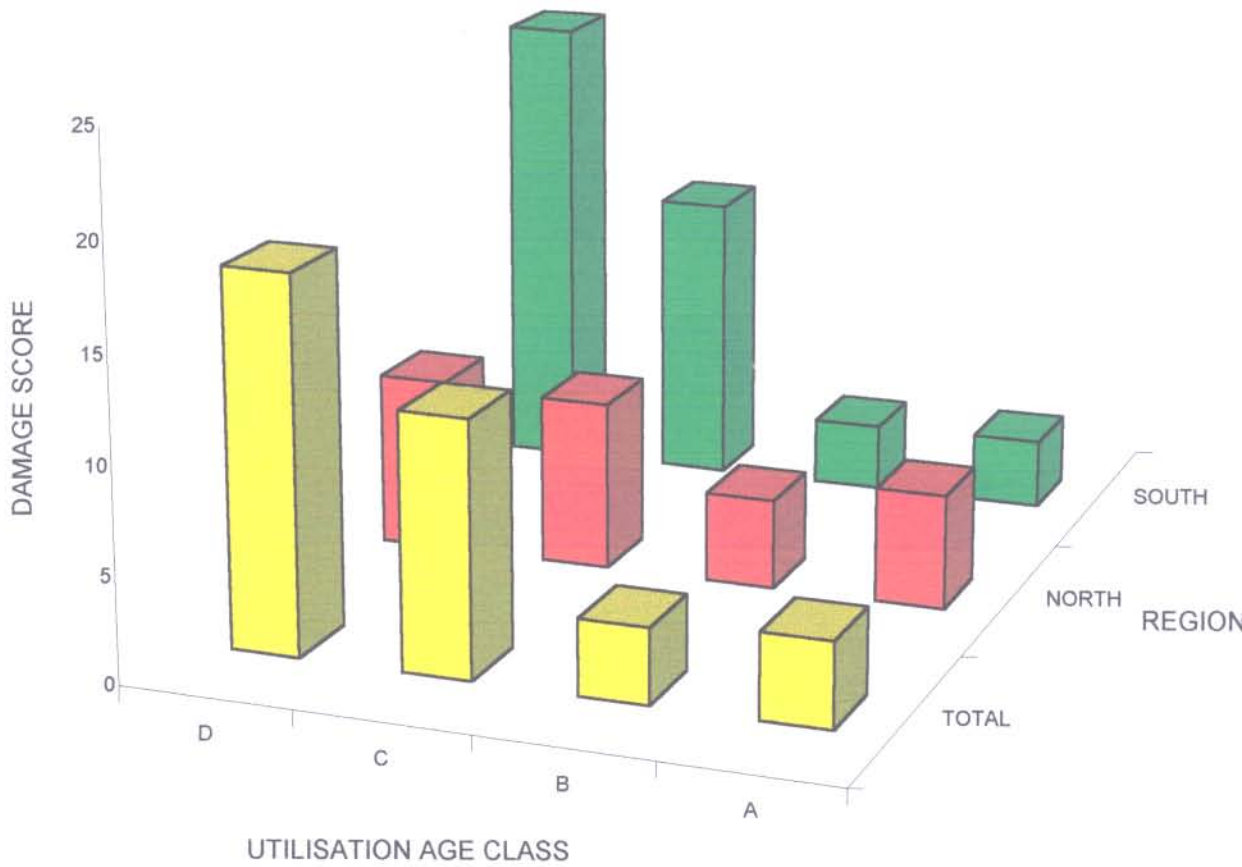
## RESULTS

### *Adansonia digitata*

The damage score of baobabs as a function of the age of utilisation is shown in Figure 17 for the two sections and the study area as a whole. This has been based on the system described above. Damage scores for class A and class B utilisation are highest in the northern section ( $z = 4.17$ ;  $P < 0.001$  and  $z = 2.20$ ;  $P < 0.05$  respectively). The southern section however has significantly higher class C and D scores ( $z = -6.93$ ;  $P < 0.001$  and  $z = -14.07$ ;  $P < 0.001$  respectively).

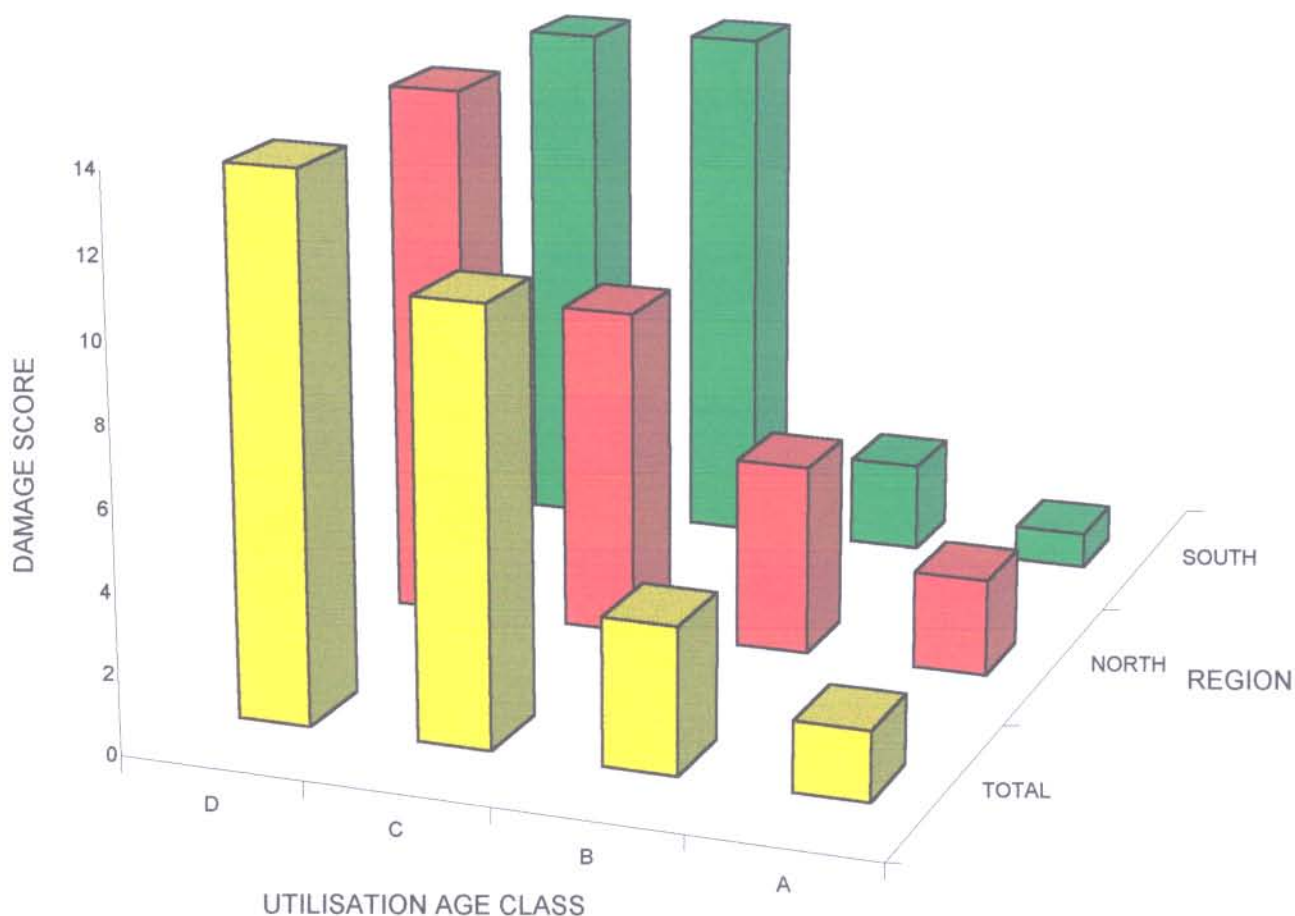
### *Sterculia rogersii*

The damage score as a function of the age of utilisation for the two sections and the entire study area is shown in Figure 18. As with baobabs damage scores are higher in the northern section for class A and B utilisation ( $z = 4.47$ ;  $P < 0.001$  and  $z = 5.13$ ;  $P < 0.001$  respectively). Trees in the southern section have a greater class C utilisation score ( $z = -6.45$ ;  $P < 0.001$ ), while damage in class D is not significantly different in the two regions ( $z = 0.27$ ;  $P > 0.05$ ).



- A: FRESHLY SCARRED TREE.
- B: SCARS BEGINNING TO FADE DUE TO EXPOSURE.
- C: NEW BARK GROWING OVER THE FADED SCAR.
- D: DAMAGED PARTS COMPLETELY COVERED BY NEW BARK.

Fig. 17: Damage scores of *Adansonia digitata* in the northern and southern study sections of the Kruger National Park as a function of utilisation age. Utilisation age class is based on the colour of the damaged plant tissue and presence of new bark.



- A: FRESHLY SCARRED TREE.
- B: SCARS BEGINNING TO FADE DUE TO EXPOSURE.
- C: NEW BARK GROWING OVER THE FADED SCAR.
- D: DAMAGED PARTS COMPLETELY COVERED BY NEW BARK.

Fig. 18: Damage score of *Sterculia rogersii* in the northern and southern study sections of the Kruger National Park as a function of utilisation age. Utilisation age class is based on the colour of the damaged plant tissue and presence of new bark.

## DISCUSSION

### *Adansonia digitata*

The age categories which have been used are based on the current appearance of damaged plant tissue. Each category therefore, does not represent the same period of time. When damage is first inflicted on a plant, it is brightly coloured, but soon fades. The first age category is only applicable to damage which is less than one year old. The second category also only applies to damage which occurred over a one to two year period, while damage in the third category covers utilisation over a much longer period. Photographs of baobabs show that this damage changes little if at all over four years and probably even more. The final damage type is in the form of very old scars. These scars persist on baobab trees for extremely long periods, and the timespan over which this damage could have occurred is undoubtedly far greater than any of the other utilisation age classes.

Some trees may be damaged, recover from the damage, and then be damaged again in the same place. The result of this is that the newer damage obscures the older damage, which can therefore, not be recorded. The values of the older damage classes are thus not accurate. The consequences of this are that the ageing system introduces bias into the results of utilisation age and comparisons made between ages are therefore inaccurate and have not been attempted.

The ageing system has, however, allowed for utilisation in the two study sections to be compared. In classes C and D, utilisation is much greater in the southern section. These discrepancies are as a result of the period during the middle of this century when the elephant density was much greater in this section. In the last one to two years, utilisation has, however, been more intense in the northern section. This is due to this section currently supporting a higher concentration of elephant.

### *Sterculia rogersii*

Utilisation by elephants of baobabs usually takes the form of bark stripping, but utilisation of star chestnuts results in branches being broken off. If the branch or stem is broken from

the tree at its base, a small scar results. This scar is visible on the tree, but if new branches grow from the same point, they obscure the scar. In many cases, evidence of the damage to these trees does not persist for as long as in baobab trees as it is obscured by growth of new branches. Trees which are severely damaged and only have the trunk remaining often coppice from this trunk and after some years growth, no evidence of the damage remains.

As with the ageing of damage to baobab trees, no consistency exists in the timespan over which damage in each of the categories could have occurred, and the data can only be used for comparisons between the northern and southern sections. The ages also differ in the two tree species. It is clear that for a period in the past, the southern tree populations were subjected to greater utilisation than trees in the northern section. The bulk of class C utilisation probably occurred during the period when only the southern section was a wildlife sanctuary. This resulted in the large difference in utilisation of trees in the two sections. Class D utilisation took place prior to either section forming part of a wildlife sanctuary, while class A and class B damage has been inflicted since 1969, once recolonisation of the northern section by elephant and other game had taken place.

## **CONCLUSION**

Comparisons between ages could not be made as each age class represents a different time period. Comparisons between the two study sections showed that damage of both tree species is proportional to elephant density.