

CHAPTER 5

Summary, Conclusions and Recommendations

5.1 Summary and conclusions

The following parameters were employed in this study: DM yield, leaf:stem ratio, chemical composition of the different *Indigofera* species (ash, CP, NDF, IVDOM and minerals), as well as voluntary intake and digestibility in comparison with *Medicago sativa* and *Leucaena leucocephala*. The highest dry matter yields were obtained in the autumn of 2004 from *I. amorphoides*. The leaves as well as the edible components were harvested over two years in different seasons. The lower leaf:stem ratio observed in autumn compared to spring is reflected in a decline in ash, CP, IVDOM and an increase in NDF concentration. It has been repeatedly emphasized in the literature that forage quality is affected by a decrease in the proportion of leaves and an increase in the proportion of stemmy fractions.

It was noted in this study, that there was a decline in chemical composition with advancing maturity and with an increase in the proportion of stem. It was stated in the literature that ageing of the plant has a negative effect on the nutritive value of forages. Despite the decrease in leaf:stem ratio with advancing maturity, *Indigofera* species maintained a fairly high forage quality. This is supported by the fact that all the species investigated in this study were above the minimum requirements of CP concentration (8%) as reported by Leng (1997).

Despite the high NDF concentration of all the species in the edible components during spring, *Indigofera* species could not be regarded as a poor feed. This is mainly because of the relatively low NDF concentration recorded in autumn of 2004 in the leaves and spring of 2004 in the edible component. Hoffman *et al.* (2001) reported that forages, which contain 40% NDF or less are generally of good quality. In spite of the advancing maturity of the plants and a decrease in leaf:stem ratio, the IVDOM of all the species in this study fall within the general range of tropical browse plants as noted in the literature.

The concentration of minerals (macro-elements and micro-elements) for all the species, for leaves as well as for the edible components, indicated levels that are adequate for ruminant feeding requirements and also proves *Indigofera* species to be a relatively good quality forage. This had been noted from the literature.

The OMI obtained in this study for *L. leucocephala* and *Indigofera* species appeared to be lower than that of lucerne, most probably due to the relatively higher NDF concentration. This is supported by many references from the literature, which reported that intake declines with an increasing NDF concentration.

The DOMI for the *Indigofera* species and *L. leucocephala* was lower than that of lucerne, as a result of an increased NDF concentration. As a result, the intake of *Indigofera* species and *L. leucocephala* were below the minimum maintenance requirements of 33.5 g DOMI/kg $W^{0.75}$ /d for grazing sheep as reported by Engels (1972). However, lucerne and *L. leucocephala* will supply the maintenance requirements of stall fed sheep. This is supported by Nsahlai *et al.* (1997) who reported that the DOMI requirements for stall fed animals are 28.2 g DOMI/kg $W^{0.75}$ /d.

Dado and Allen (1996) reported that NDF concentration is a good indicator for organic matter digestibility. This suggests that the relatively higher NDF concentration obtained in this study of *Indigofera* species and *L. leucocephala* is probably the reason for a lower OMD compared to that of lucerne, which had a lower NDF concentration.

The relatively lower NDF digestibility of *L. leucocephala* compared to that of lucerne found in this study is positively related to the lower intake. This is supported by Oba and Allen (1999) who stated that NDF digestibility is an important factor affecting feed intake in livestock. Based on the facts that have been presented, and despite the lower DOMI required for maintenance, it can be concluded that *Indigofera* species produce a fairly good quality forage, which can be used by farmers for feeding animals during drought seasons. This could also minimize the purchase of protein supplements.

5.2 Recommendations

The following recommendations are made, based on the results obtained in this study:

1. It was noted in this study that the chemical composition of different *Indigofera* species deteriorated with advancing maturity of the plant. Therefore, it is recommended that the productive value of *Indigofera* species as feed for sheep will be improved through proper management such as utilization of the herbage whilst is still immature (harvesting before it matures). This will increase the leaf: stem ratio since it was the reason for the decline in chemical composition.
2. Reid *et al.* (1988) reported that acid detergent fibre (ADF) is the best indicator of organic matter intake. It is, therefore, recommended that the analysis of ADF be considered in future.
3. It was reported from the literature that *Indigofera* species often contain toxic Indospicine. The effect of Indospicine should be examined, to determine whether it has any effect on intake and the performance of livestock. All the *Indigofera* species in this study were found to have relatively high CP concentrations. Therefore it is also recommended that the production potential of different *Indigofera* species should be evaluated using criteria such as wool growth and quality, weight gain and milk production.