

Chapter 5

Critical evaluation

Many different parameters were evaluated in this trial and it may be valuable to analyze each parameter individually in a trial, to assess its value as a contributor to the nutritive value of these plants. For example; the extensive loss of legume protein as ammonia in the rumen of animals consuming *S. microphylla* or *C. sturtii*, occurs in the absence of a readily fermentable energy source, which can result in a reduction of undegraded dietary protein flowing out the rumen. The efficiency of microbial production from rations based on forage legumes can be limited by the lack of a readily available energy source and the addition of such sources may assist in giving increased ammonia utilization and microbial protein production.

The overall results of the three feeds indicate the factors which affect the intake, palatability and degradability, and the difference between the three species can be seen. From this study the factors identified can be used to determine whether the two “treatment” feeds were suitable in supplying enough nutrients to the animal for maintenance during dry periods. It is clear that *M. sativa* still remains the most applicable legume forage of the three studied, when it comes to maintenance requirements. There are certain factors which may contribute to *S. microphylla* and *C. sturtii* being unable to provide the necessary nutrients for maintenance.

An evaluation of the tannin concentration as well as levels of other substances found by other authors to be potentially deleterious in *S. microphylla* and *C. sturtii* as mentioned in Chapter one is necessary.

A larger number of animals per treatment, or more repetitions per treatments, may also provide more accurate results and a better statistical analysis and understanding of the factors studied.

After a thorough literature research, it seems there is some valuable information in the microbial protein synthesis section of trial. It is a very interesting topic with a lot of research already conducted. The lack of proper analytical methods to analyze for total purine derivatives and possibly sample error was a limitation in this trial to determine the effects significantly.

From the research a recommendation can be made that it may be necessary to include another type of forage with *C. sturtii* and *S. microphylla*, such as combining them with lucerne to maintain animals for longer periods. It may also be beneficial to supplement with an energy source, which will improve intakes and possibly support some level of production. Although the chemical composition shows a sufficient CP, VFA concentration etc, other factors such as the high lignification and possible high tannins and other anti-nutritional factors, such as those reported by other authors on *S. microphylla* and *C. sturtii*, may affect the intake and digestibility and may also cause toxicity if fed for long periods of time.

In summary, both *S. microphylla* and *C. sturtii* had higher concentrations of all fibre parameters, CF, NDF, ADF and ADL. These nutrients contributed to the lower digestibility of the two forages as well as lower intakes which affected the nutritive value of the forages for maintenance of sheep. This is clear when comparing the voluntary intakes of all nutrients. *M. sativa* had significantly higher values for all these parameters. ME intake is also an important parameter when considering nutrient value. Again, both *S. microphylla* and *C. sturtii* have ME intake values significantly lower than *M. sativa* and also below the requirement for maintenance. These are all key factors in contributing to the effectiveness of the forages in providing enough nutrients for maintenance.

Chemical analysis is essential for understanding the nutritional potential of the forages, although it may not be sufficient. *In situ* and *in sacco* digestion as well as measuring rumen parameters, more accurately determines the nutritional value. In this trial we did not analyse for or predict the potency of anti-microbial or other anti-nutritional factors which may, together with the basic nutrient limitations mentioned above, play a significant role in whether these legume forages have the potential to sustain animals.