Effect of Cutting Interval on Yield and Quality of Three Brachiaria Hybrids in Thailand

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Introduction

In field trials in Thailand, Brachiaria hybrid cv. Mulato II produced significantly more green leaf, particularly during the dry season, than other brachiaria grasses (Hare et al. 2009). Cultivar Cayman produced more dry matter (DM) than Mulato II in one out of 3 wet seasons, and line BRO2/1794 produced similar DM yields to Mulato II (Pizarro et al. 2013).

The objective of this field study was to determine the effects of varying cutting intervals on growth and forage quality of hybrid brachiaria grasses in Thailand on infertile soils.

Materials and Methods

This study was conducted on the Ubon Ratchathani University farm in the eastern part of NE Thailand, on 3-year-old plots used for seed production studies in 2009 and 2010 (Bouathong et al. 2011). The trial was a randomised complete block design, with 2 cultivars (Mulato II, Cayman) and the line BRO2/1794, 4 cutting intervals (30, 45, 60, 90 days) and 4 replications. Plots were cut to 5 cm above ground level on May 24, 2011, and 200 kg/ha NPK (15:15:15) was applied. Thereafter, the same amount of fertiliser was applied every 45 days until November 18, 2011, when the study ended. Traits evaluated included dry matter (DM) yields and concentrations of crude protein (CP), acid detergent fibre (ADF) and neutral detergent fibre (NDF) of both leaves and stems.

Results

Increasing cutting interval significantly increased both stem and total DM yields and reduced the percentage of leaf, but had no effect on leaf DM production (Table 1). Mulato II produced significantly less stem but more leaf DM than Cayman and BRO2/1794 (Table 1). BRO2/1794 produced more stem and lower percentage of leaf than Mulato II and Cayman.

Mulato II produced significantly more leaf DM than Cayman at 30, 45 and 90-day cutting intervals and more than BRO2/1794 at all cutting intervals, and had a greater percentage of leaf than Cayman and BRO2/1794. Cayman had a greater percentage of leaf than BRO2/1794 at all cutting intervals (Table 1).

Increasing cutting interval significantly reduced CP concentrations and increased ADF and NDF concentrations in stems and leaves (Table 2). Cayman and BRO2/1794 had

| Table 1. Effects of cutting interval on stem and leaf dry matter production and percentage of leaf of 3 hybrid brachiarias. |
|---------------------------------|----------|----------|----------|----------|
| Cultivar/Line                  | 30       | 45       | 60       | 90       |
| Mulato II                      | 11238    | 13240    | 12932    | 18500    |
| Cayman                         | 10840    | 12824    | 13944    | 21197    |
| BRO2/1794                      | 10246    | 12944    | 14108    | 19786    |
| LSD (P<0.05)                   | 1862     |          |          |          |
| Mulato II                      | 2371     | 3840     | 4372     | 8552     |
| Cayman                         | 2954     | 5048     | 6227     | 13441    |
| BRO2/1794                      | 3298     | 6058     | 8335     | 14345    |
| LSD (P<0.05)                   | 1144     |          |          |          |
| Mulato II                      | 8867     | 9400     | 8560     | 9948     |
| Cayman                         | 7886     | 7766     | 7717     | 7756     |
| BRO2/1794                      | 6948     | 6886     | 5773     | 5441     |
| LSD (P<0.05)                   | 944      |          |          |          |
| Mulato II                      | 78.9     | 71.0     | 66.2     | 53.9     |
| Cayman                         | 72.7     | 60.7     | 55.5     | 36.5     |
| BRO2/1794                      | 67.8     | 53.2     | 40.9     | 27.6     |
| LSD (P<0.05)                   | 2.6      |          |          |          |
Table 2. Effects of cutting interval on mean crude protein (CP), acid detergent fibre (ADF) and neutral detergent fibre (NDF) concentrations in stem and leaf of 3 hybrid brachiarias

| Cultivar       | Cutting interval (days) | Stem CP (%) | Leaf CP (%) | Stem ADF (%) | Leaf ADF (%) | Stem NDF (%) | Leaf NDF (%) |
|----------------|-------------------------|-------------|-------------|--------------|--------------|--------------|--------------|
|                | 30          | 45          | 60          | 90           | 30          | 45          | 60          | 90           |
| Mulato II      | 8.8         | 4.7         | 5.4         | 2.8          | 12.6        | 9.4         | 9.5         | 7.1          |
| Cayman         | 9.4         | 5.5         | 4.8         | 2.5          | 13.2        | 9.9         | 8.9         | 7.2          |
| BRO2/1794      | 9.2         | 5.4         | 4.7         | 2.7          | 12.2        | 9.2         | 8.8         | 6.7          |
| LSD (P<0.05)   |             |             | 0.38        |              |             |             | 0.37        |              |
| Mulato II      | 34.6        | 35.1        | 39.1        | 44.2         | 27.8        | 28.7        | 31.3        | 31.6         |
| Cayman         | 34.9        | 37.3        | 39.4        | 43.6         | 26.2        | 27.4        | 29.3        | 30.1         |
| BRO2/1794      | 33.4        | 34.4        | 41.2        | 44.2         | 26.6        | 27.3        | 28.8        | 29.2         |
| LSD (P<0.05)   |             |             | 0.42        |              |             |             | 0.33        |              |
| Mulato II      | 62.2        | 68.2        | 69.0        | 74.3         | 61.2        | 65.2        | 68.3        | 70.5         |
| Cayman         | 61.4        | 65.6        | 70.9        | 71.7         | 61.2        | 65.6        | 70.9        | 71.7         |
| BRO2/1794      |             |             | 0.55        |              |             |             | 0.39        |              |
| LSD (P<0.05)   |             |             |             |              |             |             |             |              |
| Mulato II      | 55.5        | 59.0        | 60.8        | 63.3         |
| Cayman         | 51.9        | 55.5        | 57.4        | 58.0         |
| BRO2/1794      | 53.0        | 57.4        | 57.0        | 58.4         |
| LSD (P<0.05)   |             |             |             |              |

higher stem CP levels than Mulato II at 30 and 45-day cutting intervals and both had lower levels than Mulato II at the 60-day cutting interval. BRO2/1794 had lower leaf CP levels than both Cayman and Mulato II at most cutting intervals. Overall, Mulato II had higher leaf ADF and stem and leaf NDF levels than both Cayman and BRO2/1794 at most cutting intervals (Table 2).

Discussion and Conclusion
The significantly higher leaf DM production and percentage of green leaf and significantly lower stem DM production of Mulato II compared to Cayman and BRO2/1794, at all cutting intervals, support the conclusion of Argel et al. (2006) that high production of green leaves makes Mulato II an extremely attractive forage for livestock. Mulato II would seem to offer advantages over the other 2 hybrids for sowing in these regions. Based on the data in this study, an optimum cutting interval for the cultivars tested would involve a compromise between quantity and quality. Cutting at 30-day intervals would produce CP levels 3-4 percentage points higher than cutting at 45- and 60-day intervals, but DM production would be 20% lower than cutting at the longer intervals. Extending cutting intervals to 90 days would greatly increase DM production but CP concentrations in leaf would be down to maintenance levels for non-lactating and non-reproducing animals. The appropriate cutting interval will depend on the usage to which the forage is put and what combination of yield and quality is desired.

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