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Theme 4. Biodiversity, conservation and genetic improvement of range and forage species
Sub-theme 4.1. Plant genetic resources and crop improvement

Selection of suitable varieties of grasses for Myanmar

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Introduction

The basal feed resources for ruminants available in most developing countries in the tropics are crop residues, pasture from infertile land, for example communal land, or agro-industrial by-products. These are low in protein and of low digestibility. A major problem facing livestock producers in tropical areas is proper nutrition for their animals during the dry season when pastures, cereal residues and maize stover are limiting in nutritional quality. The researchers in Myanmar have tried to improve the nutritive value of fibrous agricultural residues. Aung Aung *et al.* (2006) supplemented the sesame and chickpea husk to bulls fed on urea-treated rice straw. One way of improving the utilisation of such crop residues is by proper supplementation with leguminous forages (Poppi and McLennan 1995).

In most regions of Myanmar, the green forage is available during the rainfall and become shortage during dry season. Therefore, feedstuff for ruminant animals mainly has to depend upon the availability of agricultural by-products. Almost more than half of the livestock population of Myanmar is inhabited in dry zone and thus, to overcome the scarcity of the feedstuff during summer, the irrigation system was introduced in these areas for the development of agriculture.

A simple and effective way to increase livestock production is to grow improved pastures. Throughout Myanmar, extensive areas of idle land could grow excellent pasture. At present, most of the "pastures" consist of low rank, poor quality grasses and a limited range of edible shrubs. During prolonged dry periods, grazing animals subsist on dry mature roughage of poor quality (Myo Kywe and Tin Mg Aye, 2007). Grass species, which can rapidly grow after the rain also having drought tolerance, would be very useful in the production system. There is still little information on the use of forage in Myanmar. It is needed to select the grass species which have drought resistance in Myanmar and thus this experiment was conducted to evaluate a range of introduced tropical grasses in the central dry zone of myanmar.

Materials and Methods

Sixteen varieties of grassed were introduced by ACIAR Project AH/2011/54.The field experiment was conducted at the University of Veterinary Science, Yezin, Nay Pyi Taw, Myanmar from June to December, 2014. Sixteen varieties of grasses; Basilisk (*Brachiaria decumbens*), Massai (*Panicum maximum*), Jarra (*Digitaria milanjiana*), Katambora (*Chloris gayana*), BR02/1794 (*Brachiarea* hybrid), Simuang (*Panicum maximum*), Cayman (*Brachi aria* hybrid), Bambatsi (*Panicum coloratum*), Mombasa (*Panicum maximum*), Ruzi (*Brachiaria ruziziensis*), Premier (*Digitaria eriantha*), Klein (*Panicum coloratum*), Mulato II (*Brachia ria*hybrid), Toledo (*Brachia riabrizantha*), Floren (*Dichanthium aristatum*) and Gayndah (*Cenchrus ciliaris*) were introduced to Myanmar (ACIAR Project) and allocated in Randomized Complete Block Design. The experimental design was Randomized Completely Block Design with 4 replicates and each small plot had 4 m long and 1.5 m interval from each plot. Each plot was seeded with 1 g of seeds according to seeding rate. During the experiment, there was no additional irrigation and fertilizer.

Four weeks after planting (planting date- 16 June, 2014), the emergence score for each species of grass was measured by visual observation with a scoring system of 1 to 5 (score 1; nil or very little, score 2; low, a lot of problem, score 3; some gaps in emergence, score 4; very good emergence and no evident problems, score 5; all plants growing with good emergence). Rows were cut to ground level on three occasions at eight weeks intervals to determine biomass and dry matter yields. The rainfall was recorded at every week

The data were analyzed for significant differences among various treatments by analysis of variance using SAS (2002). Duncan's Multiple Range Test (DMRT) was applied to compare the treatment means for different parameters and their significance levels at P<0.05.

Results and Discussion

The emergence score of different introduced forage grasses are presented in Table 1. Although the emergence score of Ruzi was similar with that of Simuag and Mombasa, that of the others were significantly lower than that of Ruzi.

Table 1 Comparison of emergence scores of different introduced forage grasses

Grass species	Variety	Emergence score
Brachiaria ruziziensis	Ruzi	3.75^{a}
Panicum maximum	Simuang	3.00^{ab}
Panicum maximum	Mombasa	3.00^{ab}
P.max x P. infestum	Massai	2.75^{bc}
Brachiaria brizantha	Toledo	2.75^{bc}
Brachiaria decumbens	Basilisk	2.50^{bcd}
Chloris gayana	Katambora	2.50^{bcd}
Brachiaria hybrid	Cayman	2.25^{bcde}
Brachiaria hybrid	Mulato II	2.25^{bcde}
Digitaria eriantha	Premier	2.00^{cdef}
Dichanthium aristatum	Floren	1.75^{def}
Panicum coloratum	Klein	1.50^{efg}
Digitaria milanjiana	Jarra	1.25^{fg}
Brachiaria hybrid	BR02/1794	1.25^{fg}
Panicum coloratum	Bambatsi	1.25^{fg}
Cenchrus ciliaris	Gayndah	0.75^{gh}

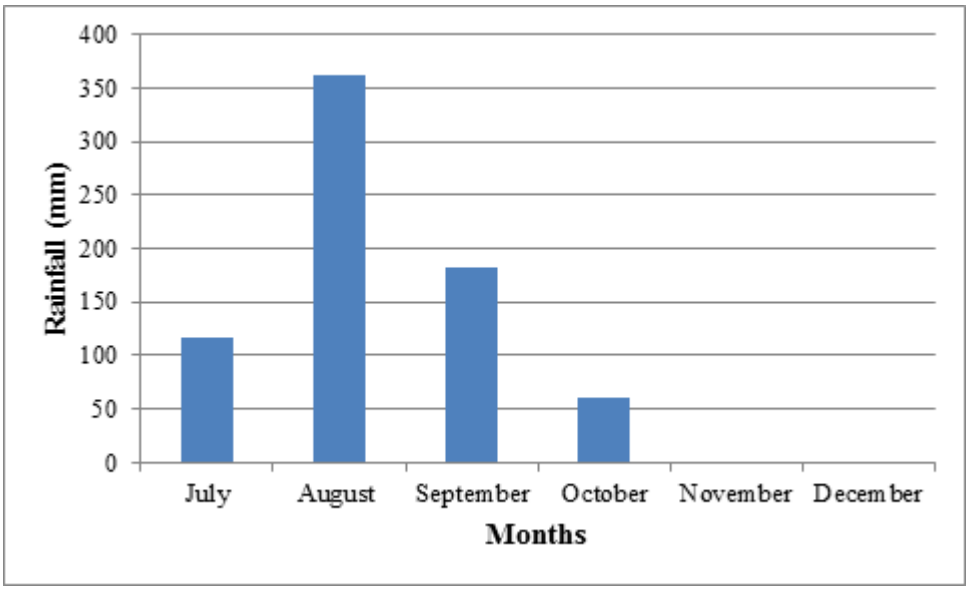
^{a,b,c,d,e,f,g,h} Values in the column with different superscripts differ significantly (P<0.05)

Table 2: Comparison of dry forage yields of different introduced forage grasses

Grass species	**Variety**	**Dry forage yields (kg/ hectare)**			
		1st Harvest (August, 2014)	**2nd Harvest (October, 2014)**	**3rd Harvest (December, 2014)**	**Pool DM Yield**
Brachiaria decumbens	Basilisk	1100^{ab}	3005^{a}	1629^{a}	5733^{a}
Brachiaria brizantha	Toledo	1034^{abc}	2631^{ab}	1151^{ab}	4816^{a}
Brachiaria hybrid	Mulato II	871^{bcde}	2436^{ab}	1103^{ab}	4410^{ab}
Brachiaria ruziziensis	Ruzi	1452^{a}	2125^{ab}	516^{bcde}	4093^{ab}
Brachiaria hybrid	Cayman	978^{bcd}	1977^{bcd}	1086^{abc}	4041^{ab}
Panicum maximum	Simuang	606^{cdef}	1117^{def}	727^{bcd}	2450^{bc}
P.max x P. infestum	Massai	550^{def}	1335^{cde}	321^{de}	2206^{bcd}
Panicum maximum	Mombasa	734^{bcde}	776^{efg}	680^{bcde}	2190^{bcd}
Brachiaria hybrid	BR02/1794	595^{cdef}	1077^{def}	405^{cde}	2077^{bcd}
Chloris gayana	Katambora	454^{efg}	488^{efg}	264^{de}	1206^{cd}
Digitaria milanjiana	Jarra	438^{efg}	349^{gf}	119^{de}	906^{cd}
Digitaria eriantha	Premier	219^{fg}	331^{gf}	127^{de}	677^{cd}
Dichanthium aristatum	Floren	62^{g}	167^{fg}	158^{de}	387^{cd}
Panicum coloratum	Bambatsi	54^{g}	200^{fg}	105^{de}	359^{cd}
Panicum coloratum	Klein	30^{g}	86^{g}	42^{e}	153^{cd}
Cenchrus ciliaris	Gayndah	0.0^{g}	0.0^{g}	0.0^{e}	0.0^{d}

^{a,b,c,d,e,f,g} Values in the column with different superscripts differ significantly (P<0.05)

Fig.1 Rainfall of the study area from July to December, 2014



During the experiment, the rainfall ranged from 61 mm to 362 mm. It is quite low rainfall. Among the 16 varieties of grass forages, Ruzi (*Brachiaria ruziziensis*) showed the highest emergence score. First harvest was done in August and Ruzi had the highest dry matter yield. However, Basilisk (*Brachiaria decumbens*) possessed highest dry matter yields at second and third harvest times. When the pool dry matter yields of all varieties were compared, all *Brachiaria* species were at the top of the list ranging from 4041 kg/ha to 5733 kg/ha. The dry matter yield of these forages are higher that of other report from Cameroon (Enoh *et al*., 2005) and lower than another report from east Thailand (Hare *et al*., 2009). This can be due to different soil type, location, weather condition and management. In an FAO report, it was stated that most of *Brachiaria* spp have been used as fodder plant in tropical America and most of tropical countries and all of the reports agree that most of the *Brachiaria* species are suitable for tropical regions.

Conclusion

It was concluded that the *Brachiaria* species were the highest yielding species of those evaluated and that they are are suitable for further testing and evaluation on farms in Myanmar.

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