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THE POTENTIAL OF *ASYSTASIA GANGETICA* AS A SUPERIOR OF LOCAL FORAGE IN BALI PROVINCE

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ABSTRACT

Local forage plants are still a mainstay for farmers to increase livestock productivity. Among the various types of local forage plants. *Asystasia gangetica* is one type of local forage plants whose potential is not yet known. The study was conducted with the aim to determine the potential of *A. gangetica* as a forage-yield. A completely randomized design with 5 levels of urea fertilizer treatment and 4 replications was carried out at the Sesetan research station in Denpasar. The results showed that plant growth as indicated by variables of plant length, number of branches, number of leaves, and leaf area per plant in the application of urea fertilizer 50 kg ha^{-1} showed the highest response, however, the lowest for the number of flowers. Aplication of various levels of urea fertilizer does not affect the yield of *A. gangetica* although there is a tendency to use urea 50 kg ha^{-1} gives 11.93% more results than without urea and 7.59% more than the use of 200 kg ha^{-1} urea. Observing the characteristic of plant growth. growth. and forage yield it can be concluded that *A. gangetica* has a high potential to be developed as a superior feed plant.

KEYWORDS: Asyatasia gangetica, forage, growth, urea.

INTRODUCTION

The policy of the Directorate General of Animal Husbandry and Animal Health of the Ministry of Agriculture to increase the scope of BPTU's activities from BPTU to BPTU-HPT throughout Indonesia. provides fresh air for quality and sustainable forage procurement efforts. Local forage as one of the local resources have a very important role in providing daily forage. However, the development of forage plant faced a variety of basic problems

such as the lack of attention to the diversity of forage plants. the lack of a collection of forage plants and infrastructure. and lack of understanding of farmers for the benefits and advantages of local forage. Besides the basic problems above, the development of forage crops still faces a big challenge because it is more directed to utilizing marginal or sub-optimal land.

The local forage plant not only a source of natural fodder. but also a source of germplasm that important in development and genetic segregation for increasing the diversity of superior tropical forage plants. Related to those things, the study about biodiversiy of tropical forage plants as a genetic source and natural fodder become more important. Today's existence of tropical forage seems decreased caused by development and human growth dynamic (Suarna *et al*., 2016). The habitat of those forage plants depressed by human modified land for increasing human residential area. Those factors caused depletion in forage plant diversity, even though each of them has a unique characteristic that locally adaptable. The unique character of forage plant is an important germplasm that passed down to every generation. It makes every forage plant has a potency to be a source for superior traits to create superior forage plant cultivar. Characterization is identifying important trait that has economic value in the plant cultivar or variety. The character that used to characterization such as: morphological, agronomical, and physiological. Evaluation is an activity to identifying nutrient compound (protein, fat, vitamin) and how the reaction of the plant variety to biotic stress (pest and disease) and abiotic stress (drought, Fe contamination, Al contamination, high salinity, and soil acidity).

MATERIALS AND METHOD

Glass-house research was done in research station of Faculty of Animal Husbandry Udayana University at Jalan Raya Sesetan 122 Denpasar. The research used completetely randomized design of *Asystasia gangetica* that treated with different level of urea. The variables that counted as superior traits are tabulated and analyzed in statistical approach. The in vitro digestibility of forages also analyzed. All of those data analyzed in ANOVA at 5% (Dwisantoso and Hari Kusnadi. 1992; Gomez and Gomez, 1995).

RESULT AND DISCUSSION

The growth of *Asystasia gangetica* was fairly good both for planted by seed or cutting. Growth variables at Table 1 and Table 2 showed only the length of plant that did not significantly different. For the amount of branch. amount of leaves. and leaf broad variables,

the treatment of urea fertilizer with 50 kg ha^{-1} showing the highest yield, but in contrary yield the lowest amount of flower and root dry-weight. It could be said if urea dosage 50 kg ha^{-1} given the most value in vegetative growth, that implied the nutrients in fertilizer mainly absorbed to support the vegetative growth. In the other word, that was a good dosage to increasing the production of green forage.

The urea dosage over 50 kg ha^{-1} causing the plants growth too dense at the prior state, so many of its leaves shading each other that affecting the physiology of the leaves. The photosynthetic process would be disturbed, and those leaves become easily to fall. In observation we also found if the plants initiate the phase of flowering faster than others. Those phenomena supported with the plants characteristic (Table 3) that pointed the dry-weight of upper part of plant was higher than the lower part (root) with *root shoot ratio* 3.34 ± 0.97.

Table 1: The urea fertilizer effect to the length of plant, amount of branch, and amount of leave.

Treatment	Growth Variables											
	Length of Plant (cm)				Amount of Branch (branch)				Amount of Leaves (blade)			
U0	77.00	±	9.13	a	21.50	±	4.65	b	113.25	±	13.25	c
U50	83.50	±	10.75	a	44.50	±	9.47	a	246.50	±	13.96	a
U100	74.75	±	4.92	a	22.25	±	1.71	b	150.25	±	13.15	b
U150	77.00	±	9.83	a	30.25	±	5.62	a	129.50	±	15.07	c
U200	87.75	±	9.32	a	20.50	±	6.24	b	123.75	±	11.44	c

Annotation

The average value of treatment that followed by the same letter at the same column showing insignificant different at (P>0.05). U = urea; 0, 50, 100, 150, and 200 is the level of urea (kg ha^{-1}).

Table 2: The urea fertilizer effect to the leaves broad, amount of flowers, and root dry-weigh.

Treatment	Growth Variables											
	Leaves broad (cm^2)				Amount of Flower (flower)				Root dry-weight (g)			
1	2				3				4			
U0	60.54	±	5.19	c	28.00	±	5.60	a	8.98	±	0.85	d
U50	82.27	±	7.02	a	6.75	±	5.50	c	4.15	±	1.38	c
U100	73.07	±	6.73	b	12.75	±	12.95	bc	6.33	±	2.13	b
U150	73.60	±	7.35	b	29.50	±	6.66	a	6.70	±	0.49	a
U200	57.61	±	4.92	c	17.75	±	9.29	b	7.35	±	0.39	d

Annotation

The average value of treatment that followed by the same letter at the same column showing insignificant different at (P>0.05). U = urea; 0, 50, 100, 150, and 200 is the level of urea (kg ha^{-1}).

Table 3: The urea fertilizer effect to the leaf area ratio, root shoot ratio, and leaf stem ratio.

Treatment	Growth Characteristic Variables											
	Leaf Area Ratio (cm^2g^{-1})				*Root shoot Ratio*				*Leaf stem ratio*			
1	2				3				4			
U0	6.46	±	0.40	a	1.05	±	0.10	b	0.44	±	0.14	a
U50	6.21	±	0.59	a	3.43	±	0.97	a	0.46	±	0.09	a
U100	7.66	±	1.15	a	1.70	±	0.76	b	0.54	±	0.11	a
U150	6.71	±	1.55	a	1.68	±	0.23	b	0.45	±	0.05	a
U200	5.52	±	0.32	a	1.43	±	0.19	b	0.37	±	0.12	a

Annotation

The average value of treatment that followed by the same letter at the same column showing insignificant different at (P>0.05). U = urea; 0, 50, 100. 150. and 200 is the level of urea (kg ha^{-1}).

At the Table 4, the variety of urea treatments did not show any significant value of stem dry-weight. The treatment of 50 kg ha^{-1} urea given higher amount of leaves dry-weight and green dry-weight compared to others. Not only for the yield, the treatment of 50 kg ha^{-1} urea also impacted the higher cover area with longer stem that made the photosynthesis more efficient. The result also supported by the prior research by Suarna and Suryani (2018) and Suarna *et al.* (2018) in *Mikania cordata* and *Alysicarpus vaginalis* respectively.

Table 4: The urea fertilizer effect to the stem dry-weight, leaves dry-weight, and green dry-weight.

Treatment	Plant Yield Variables											
	Stem dry-weight (g)				Leaves dry-weight (g)				Green dry-weight (g)			
1	2				3				4			
U0	6.65	±	1.39	a	2.78	±	0.48	ab	9.43	±	1.19	b
U50	9.18	±	1.58	a	4.15	±	0.37	a	13.33	±	1.57	a
U100	6.35	±	1.37	a	3.33	±	0.46	ab	9.68	±	1.50	b
U150	7.78	±	1.34	a	3.45	±	0.44	ab	11.23	±	1.68	b
U200	7.68	±	1.21	a	2.78	±	0.67	b	10.45	±	0.97	b

Annotation

The average value of treatment that followed by the same letter at the same column showing insignificant different at (P>0.05). U = urea; 0. 50. 100. 150. and 200 is the level of urea (kg ha^{-1}).

The digestion of dry and organic matter of *Asystasia gangetica* were higher compared with the other forage plant from grass type such as *Paspalum comersonii*. *Paspalum conyugatum*. and *Axonopus compressus*. and non-grass type such as *Ficus montana* and *Ficus firtulosa*. but lower than *Macroptilium lathyroides* (Table 5). Based on those facts. the *Asystasia gangetica* showing high quality forage with digestibility value 61.85% for dry matter and 67.35% for organic matter.

Table 5: In vitro digestibility value of dry matter and organic matter of some forage plants.

Plants	Dry matter (%)	Ash (%)	Dry matter digestibility (%)	Organic matter digestibility (%)
Ficus montana	15.56	20.67	55.24	60.65
Paspalum comersonii	15.83	14.59	34.64	38.85
Asystasia gangetica	**16.41**	**24.85**	**61.85**	**67.35**
Fucus firtulosa Reinw	14.90	12.65	39.41	46.47
Macroptilium lathyroides	13.65	11.78	71.41	72.30
Axonopus compresus	13.43	17.20	31.98	34.62
Paspalum conyugatum	31.30	13.39	40.66	42.81

CONCLUSION AND SUGGESTION

Based on the research. it could conclude if the local forage *Asystasia gangetica* was the superior forage plant with good quality and could yield 2.14 ton ha^{-1}, fast regrowth ability, and good seed dispersal. The most efficient of urea fertilizer to increasing yield was 50 kg ha^{-1}.

In line with government effort to cultivated tropical forage to produce green concentrate, we suggest to increasing the research capacity about potency of local forage to increasing ruminant productivity.

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