

## The Effect of Bali Cattle Grazed Under Coconuts on Introduced Pasture to The Weight Gain of Cattle and Botanical Composition\*

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**ABSTRACT:** Four groups of Bali female cattles each three heads (per group) which 187,25 kg average weight was grazed on 4 differences mix-pastures in 4 blocks (each one Ha wide). The light intensity under coconuts was 75% light. Block one was planted with *Paspalum notatum* cv. Competidor + *Arachis pinto* cv. Amarillo, block two was planted by *Stenotaphrum secundatum* cv. Floratam + *Arachis pinto* cv. Amarillo, block three was planted by *Stenotaphrum secundatum* cv. Floratam + *Calliandra calothyrsus* and block four was natural pasture. The block was not replicated. The highest cattle weight gain in 90 days grazing was 326 gram/day in block three and then was followed by block two and block one each was 302 gram/day and 285 gram/day. The lowest cattle weight gain was 159 gram/day in block four, in natural pasture. The botanical composition of the pasture which was

grazed a year after planting in 90 days grazing time by three cattles per ha each block and then was continued by overgrazing in one year was: *Stenotaphrum secundatum* spreaded very well (increasing till 48,9% in block two). *Paspalum notatum* spreaded slower (increasing only 20,8% in block one). *Arachis pinto* spreaded properly. After one and half year old, *Arachis pinto* spreaded till 28,3% in block one and 25,7% in block two. The last measuring composition of *Arachis pinto* decreased till 15,4% in block one and 12,5% in block two, due to overgrazing treatment in one year. *Calliandra calothyrsus* decreased rapidly under grazing, because cattle eat *Calliandra* first. In 90 days under grazing *Calliandra* decreased a lot and mostly of it was barked by cattle and then died. *Calliandra* was not suitable grazed directly look like would be better with cut and carry system.

Key Words: Bali Cattle, Introduce Pasture, Grazing, Weight Gain

### Introduction

The successful introduction of forages under plantation crops requires high quality species that are well adapted not only to the soil and climate of region but also to the special requirements of plantation crop system. These special characteristics are: (a) adaptation to reduced light regimes, (b) low growth habit (except for cut and carry situation as tall species may interfere with normal plantation management and (c) minimal competitiveness with the plantation crop.

Traditionally, where cattle were used as sweepers to keep weeds between coconut trees short enough to find the coconut. The idea to introduce new forages under coconut plantation to prepare sustainable forages and increasing farming return through cattle.

Mostly of farmer in the coconut plantation area keep cattle under coconut in a small number on native pasture (1-2 cattles per 2 ha), and waiting

long time before marketing. The new forages can increase the stocking rate per ha (2-3 head/ha - Reynold 1980) and shortening the marketing time.

The incentive for intercropping is essentially economic, since this system not only provides higher gross return per hectare but also plays an important role as an insurance risk against total crop loss (Norman, 1974).

Lot of legume and grass species have been introduced to coconut plantation area (*Brachian decumbens*, *Siratro* and *stylo-santhes guyanensis*, *Stenotaphrum secundatum* and other: Reynolds, 1988) but still in experiment, to get more multiple profit and decrease unprofitable aspect.

In this experiment was introduced species, *Arachis pinto* cv. Amarillo and *Stenotaphrum secundatum* and have been evaluated in small plot (since 1988) about the adaptability under low light in-terception (about 65% light) under coconut plantation (Rika, 1990) and then was continued by the grazing trial.

## Materials and Methods

### Forages

Three kinds of mixed pastures was compared with natural pastures in four blocks (Each block was in one hectare). The block was:

1. *Paspalum notatum* cv. *competidor* + *Arachis pintoii* cv. *Amarillo*.
2. *Stenotaphrum secundatum* cv. *Floritam* + *Arachis pintoii* cv. *Amarillo*.
3. *Stenotaphrum secundatum* cv. *Floritam* + *Calliandra calothyrsus*. The numbers of *Calliandra* trees between coconut row was 8 plants, so the numbers per ha coconut was 800 *Calliandra* trees.
4. Natural pastures.

In block one, two and three all native species grew together with the introduced species. Introduced species was planted on January 1992 and replanted again on March 1992.

### Cattles

1. Each block was grazed by 3 female cattles (pasture was grazed after one year old since planted). The total weight of the cattles in each block range between 561 kg till 563 kg (all animals was vaccinated and infected with IPOMEC to control internal and external parasites).
2. The weight gain of the cattles was measured every months. Animals was grazed on the pasture for 24 hour's and water was provided in each paddock. Grazing have been begun on February 1993.
3. The botanical composition of pastures was measured in the beginning and at the last of grazing time.
4. Two phases of grazing time, was first in 90 days (all the gain of cattles measured) and one year overgrazing (was measured just the botanical composition only).

## Results and Discussion

At the beginning the introduced pastures established very slow because a lot of weed overshadowing the *Stenotaphrum*, *Paspalum* and *Arachis*. In three months in the beginning the establishment had been helped by slashing treatment to suppress the weed. *Mimosa invisa*, *Mimosa pudica* and *Solanun* were the dominant weeds at the beginning. *Calliandra* legumes trees at block III

grew well.

A year after planted the height of *Calliandra* trees more than two meters. Two months before grazing *Calliandra* was cut to half meters height. At *Calliandra*'s blocks was also dominated by weed at the beginning. The establishment was helped by slashing the weeds, same treatment as the block one and block two.

The establishment of introduced species (*P. notatum*, *S. secundatum*, *A. pintoii* and *Calliandra*) a year before grazed was satisfied and the fastest establishment was *A. pintoii* and *S. secundatum* each 24,5% and 26,3%. The *P. notatum* was just 13,1% only. The establishment after grazing, the composition *A. pintoii* and *S. secundatum* was 28,3% and 30,1% and *P. notatum* was 17,7% only.

Under heavy grazing (July 1993 - July 1994) the botanical composition of *S. Secundatum* was still increased to about 49%, while *A. Pintoii* and *P. Notatum* was decreased.

About the establishment of *Calliandra* trees was not any problem at the beginning. At the grazing period mostly of the *Calliandra* trees decreased a lot because cattles each the *Calliandra* leaf first and barked the trees before feed grass under *Calliandra* trees. By grazing pressure mostly of the *Calliandra* trees died after a year under heavy grazing no more *Calliandra* rest.

Before grazing the production of *Calliandra* was 8,97 ton/ha (fresh) but after grazing (90 days grazing) the production was 1,1 ton/ha only. The composition of the local species was wide variation in about two and half years. Weeds mostly increased in all the blocks. The composition of legumes local was decrease.

About the weight gain of cattles was grazed on the introduced pasture in 90 days was highest on block III (*S. secundatum* + *Calliandra*) and was followed by block two and block one. The daily weight gain in block three, block two and block one was 326 gram, 302 gram and 285 gram. The lowest daily weight gain on natural pasture was 159 gram only.

Based on the daily weight gain ( 326 gram day ) with 3 heads stocking rates, so in a year is hoped got about 449,08 kg weight gain. This is not much difference with 352 kg per ha weight of cattles grazed under coconuts (Watson and Whiteman 1981.b). Other experiment recorded that animal productivity/per ha varied from a low 44 kg/ha (Manidool, 1983) to a high of 505 kg/ha (Rika *et al*, 1981), this variation was associated with a number

Table 1. Botanical Composition

Species	February 1993				July 1993				July 1994			
	Block				Block				Block			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
Arachis	24.5	18.5	-	-	28.3	25.7	-	-	15.4	12.5	-	-
P. notatum	13.1	-	-	-	17.7	-	-	-	20.8	-	-	-
S. secundatum	-	26.3	1.5	-	-	30.1	3.7	-	-	48.9	10.3	-
Calliandra	-	-	*	-	-	-	*	-	-	-	*	-
Legumes (Local)	23.4	27.1	35.3	14.5	20.5	15.8	30.1	12.7	12	13.1	9.6	15.3
Grass (Local)**	25.5	11.7	30.1	15.9	21.1	13.4	40.3	27.2	23.9	5.6	35.6	21
Imperata	8	10.3	16.9	60.5	6.1	6.8	13.8	39	12.6	11.1	21.2	35.9
Weeds	5.5	6.1	16.2	9.1	6.3	6.2	12.1	21.1	15.5	8.7	23.3	27.8
Average Height (Cm)	26.53	20.83	69.5	29.4	21.5	18.3	45	25.3	11.7	8.9	6.7	9.3
Production Fresh (Ton/Ha)	11.1	8.05	7.75	9.11	8.3	7.5	5.7	6.3	3.1	3.7	2.6	2.1
Calliandra's Height (Cm)			2.3				1.7					
Production Fresh (Ton/Ha)			8.97				1.1					

\*\* Paspallum  
Axonophus  
Brachiaria

Table 2. The Weight Gain of Cattles (February - May 1993)

Block (3 Head)	February	March	April	May	Total Weight Gain	Average (kg/month)	Average (gr/day)
I	210	217	236	244	34	11.33	125.93
	178	181	195	206	28	9.33	103.70
	173	178	181	188	15	5.00	55.56
Total	561	576	612	638	77	25.67	285.19
II	210	217	229	240	30	10.00	111.11
	190	193	208	222	32	10.67	118.52
	163	172	182	188	25	8.33	92.59
Total	563	582	619	650	87	29.00	302.22
III	199	206	221	220	21	7.00	77.78
	181	189	206	215	34	11.33	125.93
	182	188	204	215	33	11.00	122.22
Total	562	583	631	650	88	29.33	325.93
IV	196	198	205	210	14	4.67	51.85
	197	205	211	215	18	6.00	66.67
	169	172	177	180	11	3.67	40.74
Total	562	575	593	605	43	14.33	159.26

Table 3. RainFall and the Day of Rainfall (mm/days)

Month	1991		1992		1993		1994	
	Rainfall	DOR	Rainfall	DOR	Rainfall	DOR	Rainfall	DOR
January	301	8	161	8	95	4	481	16
February	342	19	461	16	52	4	270	15
March	119	6	119	8	82	7	271	13
April	148	9	153	6	322	4	52	6
May	28	2	83	6	52	4	13	3
June	0	0	11	1	37	3	11	1
July	74	4	0	0	0	0	*	*
August	0	0	28	1	45	3	*	*
September	23	2	259	7	22	2	*	*
October	47	1	794	10	159	4	*	*
November	824	11	435	13	108	5	*	*
December	178	3	462	6	322	14	*	*

\* Not recording yet

of management and environmental differences across the location although the relative influence of these difficult to assess. There was variation in light transmission, pasture species planted, soil type, fertilizer strategy and stocking rate employed.

The importance of legumes to pasture quality under coconuts was demonstrated in Vanuatu where low liveweight gain were reported for animals grazing pure *Stenotaphrum secundatum* (Vanuatu) pastures (Macfarlane and Shelton, 1986). The liveweight gain of small holder cattle grazing *S. secundatum* (Vanuatu), mixed with naturalized legumes *Desmodium cannum* and *Vigna hosei* showed average gains of 0.7 kg/head/day over 100 days measurement period (B. Mullen, pers. Common, 1994).

### Conclusion

New forages, *P. notatum* cv. *Competidor*, *S. secundatum* cv. *Floratum* and *A. pintoii* cv. *Amarillo* significantly increased.

The rapidity of establishment depend on the intensive of planting and depend on handling of establishment.

*Calliandra* is not suitable for grazing system, but will be better for cut and carry system.

The highest weight gain in 90 days grazing was on *Calliandra* pastures.

The *S. secundatum* cv. *Floratum* was the fastest spread.

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