

## **Breeding *Bos Javanicus* d'Alton cattle in eastern Indonesia cattle control, diets, draught use and feeding<sup>1</sup>**

**Tanda Panjaitan,\* Geoffry Fordyce,† and Dennis Poppi‡**

\*Balai Pengkajian Teknologi Pertanian Nusa Tenggara Barat, Indonesia; †Queensland Government, Charters Towers, Queensland 4820, Australia; and ‡University of Queensland, St Lucia, Queensland 4072, Australia

**ABSTRACT:** Cut-and-carry systems diets of monitored Bali cattle (*Bos javanicus* d'Alton) were 80% grass in Lombok villages (Kelebu and Tandek); up to half was rice straw at Kelebu. Adults were offered 30–40 kg and 20–25 kg during the wet and dry seasons, respectively. Diet collection took 2.5-3.0 hours, but 1.5-2.0 hours when rice straw was fed at Kelebu. At Tandek, collection took in average of 1.5-2.0 and 2.5-3.0 hours during the wet and dry seasons, respectively. Feed offered was 50-100% above expected voluntary feed intake. Cattle grazed in Sumbawa (Boak and Simu villages) where diet management averaged 0.2–0.3 hours daily and rice straw was up to 50% of the diet in the dry season. Daily draught power use on Lombok was usually up to 4 hours. Cattle are used more for trampling than draught in preparing fields for crops in Sumbawa.

### **INTRODUCTION**

Holmes (1987) (quoted by McCool 1992) identified the major constraint for the development of a productive and efficient beef sector in eastern Indonesia as poor nutrition. Native *Bos javanicus* d'Alton (Bali cattle) and crosses with *Bos taurus* cattle predominate in the region. Bali cattle have a small mature size and appear tolerant of diseases, parasites, nutrition, and environmental conditions (Copland, 1996). Management of cattle diets is labour intensive as feed is usually not abundant, and cut-and-carry systems are used in many regions. Cattle are also utilised for draught power in tilling soils for cropping. Nutritional demands of cattle vary in accordance with animal weights, reproductive status in cows, and draught power requirements.

We evaluated a management system to match animal reproduction with supply of feed from pasture growth, crop residues and other feeds available to farmers for breeding cattle in the region as described by Poppi et al. (2010). This paper is the second in a series of fourth, and details animal control, diets of cattle, the labour associated with diet management, and the use of cattle for draught power between late 2001 and early 2004.

### **MATERIAL AND METHODS**

Details of sites, cattle management, and overall monitoring are described by Poppi *et al.* (2010). In brief, cattle production was monitored at two villages in the wet tropics of Lombok (Kelebu and Tandek: primarily cut-and-carry feeding) and two in the dry topics of Sumbawa (Boak and Simu: primarily grazing). Average annual rainfall is approximately 1500 mm in the Lombok villages and closer to 1000 mm in the Sumbawa villages, with 0-10% of annual rainfall usually in the six months from May to October. Irrigation water was most consistently available at Tandek and Simu.

Breeding-age female cattle numbered ~20 in Boak, ~30 in Tandek and Simu and ~40 in Kelebu. Boak and Tandek villages retained prevailing management; Kelebu and Boak villages adopted alternative Bali cattle management which included use of a selected bull for natural mating which was restricted to 7 months each year, weaning when calves reached 5-6 months of age, and composting of cattle waste. A detailed monitoring system linked to unique individual animal identification was

---

<sup>1</sup> The Australian Centre for International Agricultural Research funded this study as project AS2/2000/103 (Poppi *et al.* 2004).

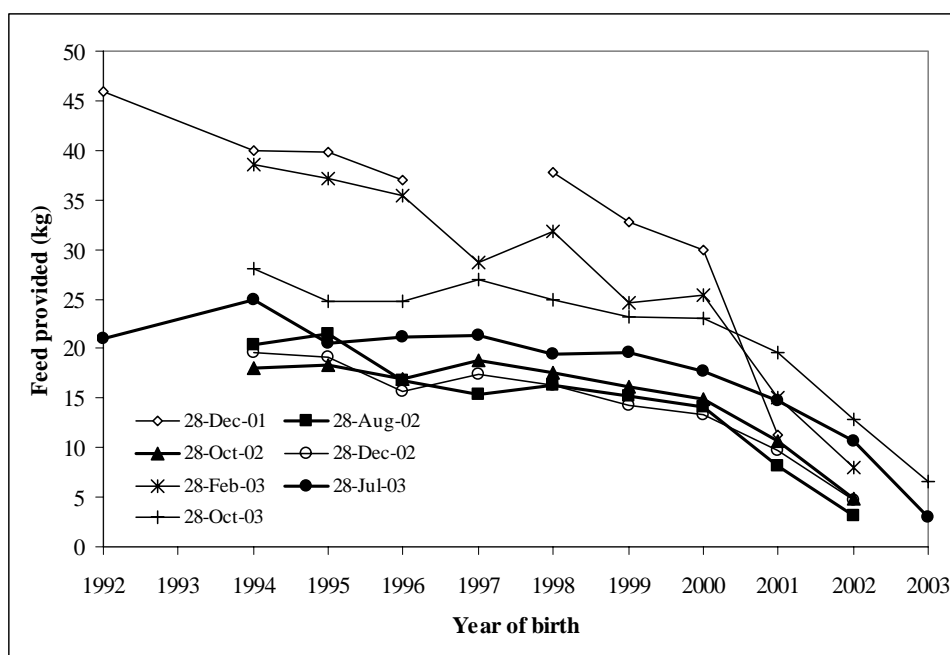
implemented, with data recorded by village-based technical officer into books and computer files with the same format.

At each monthly weighing, the owner/manager of each animal was interviewed to determine the hours each day within each control mode, the composition of diets, labour required to feed the cattle, and the hours each animal was used for draught power. Summary statistics were produced for each of these parameters within village.

## RESULTS AND DISCUSSIONS

**Kelebu Diets.** Animals are usually kept in their stalls full-time during the wet season. Animals were always penned in individual farmer stall at day time and group-penned and guarded at night to prevent theft. During the dry season, animals are tethered away from the stalls during the day, except during busy periods; 25% of them were held in stalls during the day over October 2001.

Almost all diets were cut and carry. During the wet season, 80% of cattle diets was green grass; during the dry season, 70-90% of the diet was a mix of dead and mature grass, and rice straw (up to 40% of the diet). Fresh forbs made up to 20% of the diet for most of the year. Diet composition was unaffected by animal age. Fresh weight of diets averaged 30-35 kg per adult per day during the wet season, and approximately half that amount during the dry season; juveniles were fed proportionately less in relation to weight (Figure 1). It took an average of 2.5-3.0 hours to collect the feed for one adult when grass made up most of the diet; the time taken was reduced to 1.5-2.0 hours when rice straw was a significant component of the diet.



**Figure 1.** Examples of average wet weight of feed provided per female animal per day at Kelebu.

**Tandek Diets.** Animals are usually kept in their stalls full-time; at night it is in the village collective housing, and during the day it is usually penned in individual farmer stall next to the house. Because of continuous cropping, all animals are hand fed. Diet composition was very similar to Kelebu, though grass and not rice straw was always 80% of the diet. During the wet season, approximately 35-40 kg of feed was provided to each adult daily, with this reducing to 20-25 kg during the dry season. The time taken to cut and carry the feed to each animal daily increased from an

average of 1.5-2.0 hours in the wet season to 2.5-3.0 hours during the dry season. Water availability to these cattle was limited and has to be carried; villagers supplemented cattle needs with banana trunks.

**Boak Diets.** An average of 40% of animals were free-ranging during the day; three-quarters of these were group-penned at night. Of the 60% tethered at pasture during the day, half were group-penned at night and the remainder remained tethered at pasture. Most of the diet during the wet season is grass the animals' harvest where they are tethered. Over the dry season, rice straw increased from 20% to 50% of the diet. The time taken to manage feeding each animal daily was estimated at 0.3 hours, irrespective of age and season.

**Simu Diets.** As the cattle in this village are mostly free-ranging, the diet is mostly grass in the wet season with up to 20% rice straw late in the dry season, mostly from grazing fallow rice paddies. The diet is 10-30% forbs and tree legumes. The time taken to manage feeding was 0.2-0.3 hours daily per animal.

**Draught Power.** There is increasing use of tractors to prepare fields for crops. Draught power is still a major use of cattle. The importance of draught power was high on Lombok, and low on Sumbawa. In Simu, cattle are used for trampling rather than draught in preparing fields for crops. Also, in Sumbawa, buffaloes are preferred rather than cattle for draught, if they are available. When cattle are used for draught, generally it is for a maximum of 4 hours in one day; however, occasionally animals may be used for up to 6 hours.

At Kelebeh, yearling bulls and females of all ages, excluding calves were used for draught power. December was the peak month for draught power (over 1600 hours for the month) and animals were used for 30-40 hours for the month (Table 1). Less than 500 hours of draught power was used in November with average work time per animal per month closer to 10 hours. Draught power requirements were much less over the remainder of the wet season, with no requirements during the dry season.

The need for draught requirements of animals also reach the peak at Tandek in December and January when 1,500-2,500 hours of draught power is used. At this time, two-thirds of the available animals are used for 20-90 hours per month on average (Table 1). Very few animals less than 2 years of age are used for draught at Tandek. As cropping is continuous, draught power is used throughout the year, with timing of crops dependent on seasons. Outside the peak period, draught power was required for an average of up to 30 hours per animal over a month, when total draught requirements for the village varied from nil to 1,000 hours.

The early wet season is also the peak draught period at Boak, where only females over 2 years of age are used for an average of 20-60 hours over a month (Table 1). Less than a quarter of these animals are used to do up to 400 hours of draught in a peak month for the village. There is also limited use of draught power for the smaller second and third crops each year.

This paper provides unique descriptions of diets and diet management of Bali cattle in four eastern Indonesian villages. It also provides an understanding of typical prevailing draught power use of Bali cattle in the region. This data is vital in developing programs which aim to improve nutritional management of cattle in this region.

Without detailed analyses of the diets offered, it appears that farmers are very capable of providing the feed required by these relatively small cattle. Larger cattle require proportionately more feed. Our general observation in the region is that larger cattle bred or purchased by farmers are often in relatively low body condition. This is most likely because the farmers have insufficient time to collect more feed or that more traditional feeds are not available. A potential solution to this problem is the use of rice straw, which is traditionally burned, supplemented with protein such as that derived from leguminous tree leaves. Because collection, drying and storage of rice straw is potentially time-efficient, this strategy may also enable farmers to own more cows.

The feed provided to cattle at Kelebeh was approximately 50% above expected voluntary feed intake (VFI). The cattle are fed in stalls with the feed available in bunks. Some of the feed is dropped and trampled by the cattle. At Tandek, where fewer farmers feed from bunks, cattle were fed up to twice their expected VFI. Feed is valued at Rp1000 per hour; this is the fee paid by owners or managers of cattle if they are unable to collect feed for cattle they tend. Savings of up to Rp100, 000 per animal per year might be made if the time taken to collect 20% less feed was reduced by 10%;

some of this surplus could be used to improve housing and feeding facilities for the cattle to facilitate more efficient feeding.

**Table 1.** Use of Bali cattle for draught power

Village	Kelebu	Kelebu	Tandek	Tandek	Boak
Gender	Females	Bulls	Females	Bulls	Females
Class	>Weaners	>Weaners	>1 year	>1 year	>2 years
Available	60-70	9-20	22-38	8-25	24-40
<i>Proportion of available animals used</i>					
Nov-01	41%	35%			0%
Dec-01	47%	42%	68%	72%	16%
Jan-02	3%	0%	73%	60%	18%
Feb-02					22%
Mar-02					5%
Apr-02	27%	0%	76%	29%	0%
May-02					0%
Jun-02	0%	0%			10%
Jul-02					0%
Aug-02			69%	38%	
Oct-02					13%
Nov-02					0%
Dec-02			93%	36%	8%
Jan-03			97%	50%	8%
Mar-03			0%	0%	
Sep-03			50%	0%	
Jan-04			100%	0%	
<i>Average hours of draught per month for animals used</i>					
Nov-01	13	11			0
Dec-01	43	30	34	38	20
Jan-02	9	0	18	19	29
Feb-02					49
Mar-02					10
Apr-02	16	0	15	32	0
May-02					0
Jun-02	0	0			15
Jul-02					0
Aug-02			10	18	
Oct-02					12
Nov-02					0
Dec-02			89	89	43
Jan-03			11	18	61
Mar-03			0	0	
Sep-03			0	26	
Jan-04			81	72	

## CONCLUSION

This study provides description of diets, diets management and an understanding of prevailing draught power use and vital to improve nutritional management of cattle in this region.

#### LITERATURE CITED

- Copland, R.S. 1974. Observations on banteng cattle in Sabah. *Tropical Animal Health and Production* 6, 89-94.
- Fordyce, G., T. Panjaitan, T. Julianto, E. Kurt and D. Poppi. 2010. Breeding *Bos javanicus D'Alton* cattle in eastern Indonesia. 4. Cattle reproduction. *In: The 5<sup>th</sup> International Seminar on Tropical Animal Production, Yogyakarta, 19-22 October 2010.*
- McCool, C. 1992. Buffalo and Bali cattle – exploiting their reproductive behaviour and physiology. *Tropical Animal Health and Production* 24, 165-172.
- Poppi, D. Dahlanuddin, T. Panjaitan, and G. Fordyce. 2010. Breeding *Bos javanicus D'Alton* cattle in eastern Indonesia. 2. Monitoring village cattle. *In: The 5<sup>th</sup> International Seminar on Tropical Animal Production, Yogyakarta, 19-22 October 2010.*