JAVANESE ZEBU CATTLE OF PAPUA NEW GUINEA EXTINCTION BY NEGLECT

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ABSTRACT

Cattle of South-east Asian origin were introduced and became widespread in New Guinea during German colonial times. The predominant type was a small, distinctive zebu-type animal which became known as the Javanese Zebu. These cattle were used for vegetation control under coconuts as well as for beef. The herds were decimated and dispersed during the Japanese occupation but a number were re-established post-war and, in the mid 1970s, government officers accumulated such cattle to establish breeding herds at Erap in Morobe and Urimo in East Sepik. A limited amount of comparative production data were obtained before these herds too were dispersed in the 1980s. There are now no known purebreeding herds in existence but there may be a number of these cattle still owned by smallholders in the Sepik Plains area. The FAO – UN lists the breed as endangered and, short of a major salvage operation, it may well be regarded as extinct. The available data and publications all come from the work of Dr John Holmes and his colleagues, but there are only three research papers. Compared to typical lowland Brahman crossbred commercial cattle, Javanese cattle are smaller and grow more slowly when on good pasture. They are more fertile but the margin is small under good conditions. However, the Javanese cattle are clearly superior in all aspects of productivity in the harsh environment of the Sepik Plains. If indeed the breed has been lost due to over 20 years of neglect by government agencies and the cattle industry, it will be difficult to replace for beef production in the harsh, humid, poor fertility lowland grasslands. The conservation of domestic animal biodiversity at the sub-species level is crucial as production industries face uncertain futures.

Keywords: *Cattle, Javanese Zebu, Brahman crossbreed, Dressing percentage, grasslands.*

INTRODUCTION

Cattle of Southeast Asian origin were variously introduced into the then New Guinea colony by the German Administration, planters and missionaries from the 1880s up until the change in administration as a result of the First World War (Holmes 1977, Holmes *et al.* 1977). Cattle of a variety of types and origins became widespread throughout the colony or protectorate where coconut plantations were established. While there are various references to the introductions in records such as those of the New Guinea Kompagnie, it was rarely clear what kinds of animals came from where, most having been loaded on route. Indications are that most came from the Dutch colony of Batavia or Java but cattle were also introduced from Thailand. A distinct type of zebu cattle became widespread and known as the Javanese Zebu. These cattle were ideally suited to the control of grass growth under coconuts.

The regions of the New Guinea north coast mainland and islands where most plantations were concentrated were also the areas occupied by the Japanese army during the Second World War. As a result of slaughter for food supply and intense fighting, the cattle herds were decimated and many cattle became feral. Post-war, a number of plantations and Catholic missions, particularly in the Sepik, Madang and New Ireland Provinces of what is now Papua New Guinea (PNG), re-developed herds of Javanese cattle. It is believed that few if any of these herds retain these animals in pure-breed form today.

These Javanese Zebu (JZ) cattle of PNG have featured in publicity releases by FAO as an example of a threatened domestic animal resource. The FAO World Watch List for Domestic Animal Diversity (Scherf 2000) lists the breed type as endangered with a decreasing population trend. They state that the total number of breeding females may be as low as 400 and there are no banked germplasm materials. Endangered is defined for breeds as having between 100 and 1000 breeding females or 5-20 breeding males.

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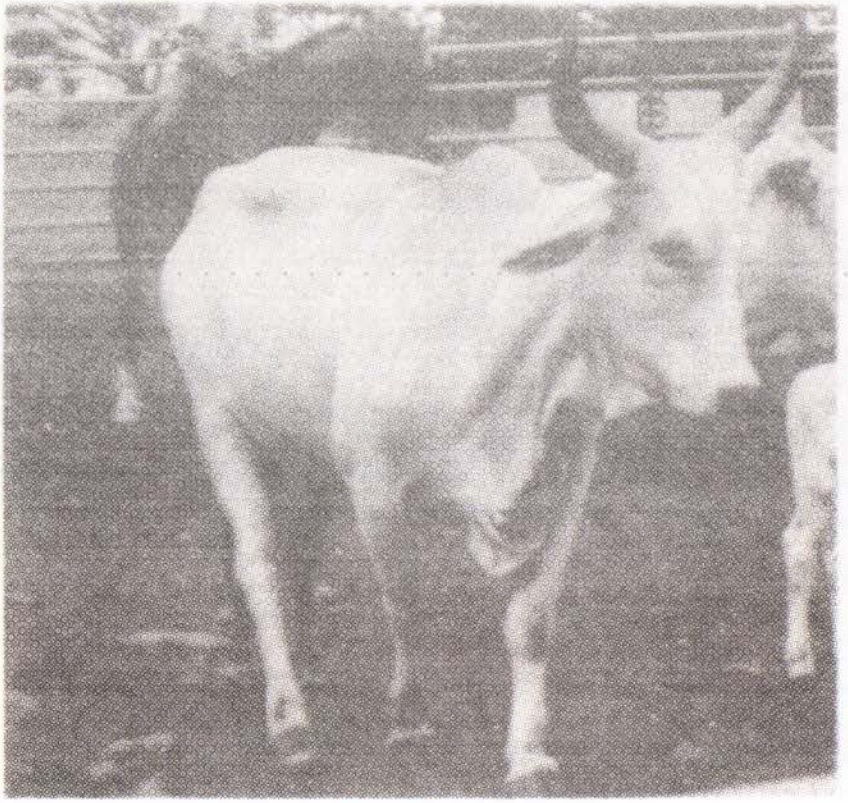
No survey of the status of this breed has been carried out since 1979. The two government herds with these cattle were dispersed and many of the existing cattle are presumed feral. Anecdotal evidence suggests that there may be a reasonable number of animals of the type with smallholders in the Sepik Plains area and Holmes (1980) estimated that there might be 2000 animals total. Another major salvage operation as was undertaken in the mid 1970s to establish the government herds would probably be necessary to save the breed from extinction, if not already too late. It is thought worthwhile to aggregate and summarise the limited amount of data in the small number of publications concerning these cattle for ease of reference. A systematic description of the breed is given by Holmes (1980) and the only available photograph is given in Figure1 from Holmes (19811b).

THE TWO GOVERNMENT HERDS

From 1974, officers of the PNG government Department of Agriculture, Stock and Fisheries (now Department of Agriculture and Livestock) accumulated JZ cattle to establish herds on the government ranches of Erap and Urimo. Holmes *et al.* (1992) state that the department purchased one bull and 24 females of a range of ages from Catholic missions in the Lower Sepik, 33 heifers and four bulls from coconut plantations near Madang, and 25 heifers and two bulls from plantations in New Ireland. The available data were only begun to be collected after the formation of these government herds and there are only seven publications altogether, all authored or co-authored by Dr Holmes. Of these, only three papers contain experimental results with estimates of precision attached to production statistics. All data come from purebred or crossbred cattle on the two stations.

The former Beef Cattle Research Station at Erap in the Markham Valley of Morobe Province is situated at 100 m above sea level, has an average annual rainfall of 1250 mm and has a temperature range of 18o-35o C with little annual variation. The recently deposited alluvial silt and sandy loam soils support pastures of *Dichanthium annulatum*, *Imperata cylindrica* and *Cenchrus ciliaris*. The former Sepik Plains Livestock Station, now mainly reverted to traditional land ownership, has a considerably harsher environment. While the climate is similar to

Figure 1. Javanese Zebu Cow.



that of Erap, except for a higher annual rainfall averaging 1700 mm, the podsolic soils have multiple mineral deficiencies for cattle production, the major limitation being phosphorus as shown clearly by Holmes (1981a). The vegetation of these rolling grass plains is an association of *Imperata cylindrica, Themeda australis, Lochaemum barbatum* and sedges.

DESCRIPTION AND PRODUCTION DATA

According to Holmes (1980), the animals come in a variety of coat colours, the commonest being fawn with a black stripe along the spine. The coat is short, ears small (15 cm) and held horizontal, hump overhanging or pyramidal, horns variable in colour and direction but not twisted, and the udder small, neat and closely attached. Bulls weigh 500-580 kg while cows weigh 320-410 kg. The cattle are quiet but alert in the field. In yards they can become very excitable and nervous. They are good mothers and are very aggressive when the calves are young. They are the most resistant of all the PNG cattle to ticks which have a limited distribution in PNG and screw worm.

The most comprehensive set of comparative reproduction and calf growth data comes from assessment with continuous mating over five years of Brahman crossbred (BX) and JZ cattle and their reciprocal crosses at Erap (Holmes *et al.* 1992). The BX cows were typical lowland commercial cattle and there were 20 heifers (later reduced to 14 cows) in each mating group. Three bulls of each breed were used sequentially.

Tables 1 and 2 are reproduced directly from the Holmes *et al.* (1992) paper and give the relevant data on cow weights and calving intervals by cow breed and on calf weights and pre-weaning growth rates by breed of dam and sire. Initial heifer mating time was determined by weight rather than age, based on earlier experience, and hence the JZ heifers were mated some 134 days earlier and 100 kg lighter than the BX heifers. Nevertheless, JZ cow weights never approached those of the BX and JZ cows were 62-73 percent of the weight of the BX. Calving intervals for the JZ were 19 days shorter.

Purebred BX calves were 10 kg heavier at birth than JZ calves and grew 48 percent faster to weaning at 7.5 months. Pre-weaning average daily gains were 0.68 kg and 0.46 kg respectively. The effect of the breed of sire in the reciprocal crosses was quite small.

Holmes (1981b) reported average calving intervals and pre-weaning growth rates for both types of cattle at Erap and at Urimo. Intervals were 14 months for BX cows at Erap, 22 for BX at Urimo, 12 for JZ at Erap and 13 months for JZ at Urimo. These intervals are probably closer to what might be expected in a smallholder herd than the least-square means in Table 1. Corresponding pre-weaning growth rates were 0.72 and 0.35 kg per day for BX at the two

Table 1. **Least squares breed and parity means of weights and intervals during calving cycles in BX and JZ cows and calf pre-weaning weights**

Trait	Breed	Parity				
		1	2	3	4	5
Cow Traits						
Weight (kg) at:						
Conception	BX	333	368	404	448	428
	JZ	217	262	276	279	292
Pre-calving	BX	424	455	471	487	486
	JZ	293	306	309	333	322
Minimum during lactation	BX	363	392	396	406	375
	JZ	241	270	274	284	253
Weaning of calf	BX	380	413	424	431	397
	JZ	277	294	273	312	278
Calving Interval (days)	BX	1078 *	389	357	365	370
	JZ	944 *	370	338	346	351
Calf Traits						
Birth Weight (kg)		31.3	31.9	31.3	28.4	27.4
Birth weight/Cow pre-calving weight (%)		8.7	9.0	8.8	8.0	6.6
Average Daily Gain (kg/day)		0.58	0.64	0.60	0.52	0.50
Weaning weight/Cow weight at weaning (%)		50	52	49	40	45

* Time between birth of cow and birth of first calf

Table 2. **Least squares means for birth weight, birth weight as a proportion of cow pre-calving weight, average daily gain to weaning and adjusted weaning weight as a proportion of dam weight at weaning for BX – BX, JZ – JZ, BX – JZ and JZ – BX**

Trait	Mean	Breed of Dam	Breed of Sire		
	(SE)		BX	JZ	Both
Birth Weight (kg)	30.1	BX	35.1	30.8	33.0
	(0.7)	JZ	29.3	25.0	27.2
		Both	32.2	27.9	
Calf birth wt/Cow pre-calving wt (%)	8.0	BX	7.8	6.7	7.3
	(0.3)	JZ	9.3	8.3	8.8
		Both	8.6	7.5	
Pre-weaning Average Daily Gain (kg)	0.57	BX	0.68	0.61	0.65
	(0.01)	JZ	0.53	0.46	0.50
		Both	0.61	0.54	
Calf weaning wt/Cow wt at weaning (%)	47	BX	47	43	45
	(1.0)	JZ	52	47	50
		Both	50	45	

sites and 0.50 and 0.52 kg for JZ. Weaner production per cow in kg per year were 162 and 61 for BX at the two sites and 122 for JZ at both sites. BX cows at Urimo lose 30 percent of their body weight during lactation (Holmes 1977) compared to five percent and 11 percent for JZ and BX heifers at Erap. The environmental effect of the conditions at Urimo on performance of the BX cows is clear.

Two reports on feeding experiments give data on the post-weaning growth of steers and on carcass characteristics. Holmes (1979) grazed steers of the two breeds at Erap on three feeds with three steers per group. The feeds were Nunbank buffel grass pasture and two cultivars of the tree legume *Leucaena*. The experiment ran for one year. Initial weights of the 14-17 month BX steers averaged 215 kg while the 12-18 month JZ steers averaged 177 kg. Since there were no differences in steer growth between the feeds, the data in Table 3 are given as breed means.

BX steers grew significantly faster than JZ steers with a greater total weight gain. However, the breeds had similar dressing percentages since the JZ steers had smaller but fatter carcasses.

In the second experiment, Gwaiseuk and Holmes (1985) fed steers for 18 weeks on treatments to evaluate the use of wheat millrun as a supplement to grazing of buffel grass pasture. Breed differences were not analysed as such and only data relevant to the breed comparison are given here. There were two 20-24 month JZ steers and two 16-24 month BX steers on each treatment. Relevant data from the grazing and four hours of millrun feeding as a supplement to grazing treatments are given in Table 4. JZ steers did not respond at all well to higher levels of millrun supplementation. The only significant breed difference was that for average daily gain on full grazing when the BX out performed the JZ steers.

Table 3. **Growth and carcass characteristics of JZ and BX steers at Erap**

Breed	Javanese Zebu	Brahman Cross
Average daily gain	0.3 kg	0.4 kg
Total liveweight gain	105 kg	143 kg
Final weight	282 kg	358 kg
Carcass weight	170 kg	212 kg
Dressing percentage	60.3 %	59.2 %
Backfat thickness	6.4 mm	3.8 mm

Table 4. **Growth and carcass characteristics of JZ and BX steers on grazing and limited millrun supplementation**

Treatment	Grazing only	Millrun 4 hours	Grazing only	Millrun 4 hours
Breed	JZ	JZ	BX	BX
Growth rate per day	0.61 kg	0.97 kg	0.83 kg	1.07 kg
Final liveweight	345 kg	386 kg	358 kg	391 kg
Carcass weight	192 kg	215 kg	194 kg	215 kg
Dressing percentage	55.6 %	57.4 %	54.2 %	54.9 %
Backfat thickness	6 mm	9 mm	4 mm	8 mm

CONCLUSIONS

In summary it seems appropriate to quote the conclusion and recommendation of Holmes *et al.* (1992). They "conclude that crossbreeding BX and JZ to produce F1 cattle is unlikely to be advantageous in PNG unless greater advantages are shown than found here. The BX cattle at Erap have high fertility and good growth rates. JZ cattle are smaller and more fertile than BX, but this advantage is smaller under good conditions and their energetic efficiency is unlikely to be significantly greater. Under harsh, humid equatorial lowlands conditions JZ are superior and their contribution to beef production in Papua New Guinea probably lies in these areas."

If indeed the breed has been lost due to over 20 years of neglect by government agencies and the cattle industry, it will be difficult to replace for beef production in the harsh, humid, poor soil fertility, lowland grasslands. The conservation of domestic animal biodiversity at the sub-species level is becoming of increasing concern worldwide and is crucial if production industries are to have the flexibility to adapt to uncertain futures. If it is not already too late to act, the JZ cattle of PNG should not be allowed to vanish through neglect or ignorance of their actual or potential contribution to beef production from the nation's grassiands.

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