

Impact of extensive versus intensive cattle systems on livestock and environmental health in the Brazilian Pantanal

At 195,000km², the pantanal is the largest freshwater wetland in the world. Located in southern Brazil, it overlaps with neighbouring Paraguay and Bolivia and has high densities of wildlife and livestock, with over 98% of it the land area owned by cattle ranches. The densities of livestock varies greatly from one unit to another as more recently, some ranches have cut back their stock and earn a portion of their income from tourism. The purpose of this study was to investigate the effect of this disparity in stocking densities and compare its impact on the quality of the animals and of the environment they inhabit.



The pantanal wetland

The dominant breed is the 'zebu', known for its resilience and ability to thrive in hot, dry conditions. The ranches mostly operate a low-input, low-output system where the animals are turned out onto the scrub to graze for months at a time before they are brought in. They are routinely vaccinated against rabies, botulism, IBR, brucellosis,



Zebu cattle

BVD, and enterotoxemia. In addition to infectious disease, predation by wildlife (notably the jaguar) causes problems for livestock farmers in some areas. The majority of the beef produced is for local consumption rather than the export market. The region has a tropical semi-humid climate with the majority of its rainfall between October and March. This year the dry season was exceptionally severe, with very hard ground, water holes drying up and rivers at their lowest levels.

The data was collected from three different units in the northern pantanal, all along the transpantaneira road south of Poconé. At each ranch, 60 cattle were brought in and each was condition scored and given a tick score (by counting the number of ticks on their ears). Water samples were also taken from swamps and lakes in the grazing areas at each unit and tested for ammonia, nitrite and nitrate (as an average from 3 different sources).

A table showing no. of livestock and land area at each unit

	Land Area (hectares)	Cattle Head
Unit 1	2500	300
Unit 2	4000	200
Unit 3	7000	1200

A table showing stocking density, mean condition score, tick score and water parameters at each unit

UNIT	1	2	3
Stocking dens (head/hect)	0.12	0.05	0.17
Mean Condition Score	2.8	2.1	2.8
Mean Tick Score	0.38	0.22	1.90
Ammonia	0.0	0.0	0.0
Nitrite	0.0	0.25	0.25
Nitrate	0.0	0.0	0.0

Interestingly, the figures above show that mean condition score is actually not correlated with condition score at all. This is what is expected as the stocking density will incorporate pasture quality in each region in addition to land area. We might even expect to see an inverse relationship here as the data was collected during the peak of an exceptionally dry season where areas that are naturally dryer or more sparsely grassed were almost void of pasture. As a result many farms were grazing additional stock from such units which distorts the data slightly. The correlation between stocking density and tick density is however a very direct one,



Condition scoring cattle

the latter increasing consistently with the former. The data from water quality assessment is difficult to draw conclusions from primarily due to its small size, which was a limitation of an experiment of this nature. A high ammonia level would usually be attributed to excessive waste produced by aquatic life (or an inability to break it down) as this is their main form of N-excretion. A raised Nitrite level without a raised ammonia level implies there is a surge in N-containing compounds being deposited in the water. Whether the source is livestock or not is difficult to ascertain but in order to gauge this in a fair way, samples would have to be taken



Tick scoring

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from several water sources at each unit and over a wide area. It is certainly an area worthy of further investigation.

While large numbers of wild animals were seen at all units, it is difficult to gauge quantitatively the impact of agriculture on densities of wildlife, especially over a short time frame. It seems clear that the pantanal is unique as a place where livestock and wildlife have coexisted in harmony for centuries. Whether they will continue to coexist in this manner with the changing climatic and agricultural patterns remains to be seen. The boom in the tourism industry in recent years has meant that many farmers now value their biodiversity more than their cattle (which many have cut back), in line with their proportionate income. The previous threats to the natural heritage of the area from smuggling of birds/reptiles and hunting of jaguars (due to livestock predation) have largely been eliminated due to their increased value in the natural state. As world food demand continues to grow, the way in which we feed the growing population and its impact on the environment is becoming an ever more controversial topic to which the pantanal serves an interesting example. Due to the extremely dry conditions this year, lack of pasture and displacement of large numbers of livestock, the data has become somewhat skewed and some of the variables could not be investigated properly (eg water and pasture quality). Some days were also spent treating sick animals as veterinary services were difficult to access at some units.



Jaguar patrolling its territory near a cattle unit

The intense heat during the day meant that rehydration and provision of shade to ‘down’ animals was essential to maintain fluid levels. Methods of managing livestock alongside wild animals were also discussed at some farms, an area which can be challenging and sometimes sensitive, as in the UK.



Injecting a cow with antibiotics

Cattle production in the pantanal is largely representative of livestock rearing in many tropical parts of the globe and has given me significant insight into the methods and constraints this involves. I’d like to thank the BVA for awarding me an overseas travel grant as it has encouraged my interest in sustainable agricultural development, an area in which I hope to be involved as a qualified vet.