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THE PROFITABILITY, GROWTH AND MEAT QUALITY OF GRAIN FINISHED ENTIRE MALE AND CASTRATED *Bos indicus* CATTLE FROM A NORTH AUSTRALIAN PRODUCTION SYSTEM

Thesis submitted by Steven Wainewright B.Ag

February 2012

In fulfilment of the requirements for the Degree of Master of Tropical Animal Science in the School of Veterinary & Biomedical Sciences at James Cook University, Australia
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<table>
<thead>
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<th>Name and Affiliation of Co-contributors</th>
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<tr>
<td>Intellectual support</td>
<td>Statistical support and data analysis</td>
<td>Dr Sandy Clarke, The University of Melbourne, Statistical Consulting Centre</td>
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<tr>
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<td>Meat science laboratory and equipment</td>
<td>Dr Geert Geesink, Dept of Meat Science University of New England, Armidale</td>
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I declare that this thesis is my own work and has not been submitted in any form for another degree or diploma at any university or other institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

Steven Wainewright
November, 2011

DECLARATION OF ETHICS
The research presented and reported in this thesis was conducted within the guidelines for research ethics outlined in the James Cook University Statement and Guidelines on Research Practice (2001). The proposed research methods received clearance from the James Cook University Experimentation Ethics Review Committee.

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November, 2011
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commitment and her love this would not have been possible. From the bottom of my heart thank you.
ABSTRACT

The profitability, growth, carcass and meat quality from high grade; grain fed *Bos indicus* entire male and castrated cattle that were either positively or negatively homozygous or heterozygous for the calpastatin gene from a vertically integrated north Australian production system were investigated. Preliminary analysis into the profitability of producing entire vs. castrated male cattle for the domestic market using Breedcow herd budgeting software was undertaken based on a hypothetical breeding herd of 1200 cows. Although entire males had higher gross margins compared to castrates during the finishing phase, they were unable to make up the earlier losses of $24.04/AE at weaning. There were no differences in performance between entire males and castrates prior to the onset of puberty in the on-farm experiment. Following the onset of puberty and combined with an energy dense finishing ration, entire males grew 27% faster than castrates. There were no differences in temperament between the castrates and entire males (P > 0.05). Entire males produced carcasses that were heavier (P = 0.005), had less marbling (P = 0.001) and were more mature (P = 0.007) compared to carcasses from castrates. Both entire males and castrates that were negatively homozygous or heterozygous produced carcasses that were heavier than carcasses from animals that were positively homozygous for the calpastatin gene (P < 0.05). All but one entire male carcass qualified as gain fed yearling beef (GFYG) under the Ausmeat selection criteria and consequently were awarded a similar price per kg compared to castrates. The price combined with the heavier carcass weights resulted in entire males being $50 more profitable per carcass compared to castrates. Entire males produced tougher samples of the *M. Longissimus dorsi* after aging for 14 days (P = 0.001) and 28 days (P = 0.005) compared to castrates. Selecting animals that were either positively or negatively homozygous or heterozygous for the calpastatin gene didn’t affect *M. Longissimus dorsi* meat tenderness. In conclusion entire male cattle can be managed and produced for the domestic trade, profitably, in accordance with Ausmeat selection criteria. In addition, meat tenderness in *Bos indicus* castrated or entire male cattle was unable to be improved by selecting against the calpastatin gene.
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<td>AE</td>
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<td>ATP</td>
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