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TRANSPORTATION STRESS IN CATTLE : PHYSIOLOGICAL PARAMETERS OF BALI CATTLE TRANSPORTED FROM KUPANG TO JAKARTA

ANIMAL JESSTC

INTRODUCTION

Camara Nusantara Ship => "Tol Laut"

Efficiency

Weight Loss

Animal Welfare



Directly

Well Designed

Minimize stress factor

Supply chain

BACKGROUND



TRANSIT RPH Sorek Pakan Baru

TRANSIT Tulis - Batang Semarang

KARANTINA Bima Sumbawa

KARANTINA Teno Kupang NTT

TRANSIT Bandar Jaya Lampung

KARANTINA Tandes Surabaya

KARANTINA Pare-Pare (PT. BULI)

→ Angkutan Darat

→ Angkutan Laut



01 Meat Consumti

1993-2015 : 0.704 – 2.4 kg /capita/year (PUSDATIN Kementan 2016)

02 Weight loss

Cargo ship (sea transportation)
from Kupang -> Tandes -> Surabaya : 5 days (120 hours)
Weight loss : 15-20 % (Permana 2018)
Vehicle by truck (road transportation)
From Surabaya -> ½ days (10-14 hours / ± 780 km)
Weight loss : 10-15% (Permana 2018)

03 Camara Nusantara S

Darwin
Austra

Camara ship (sea transportation) : "Tol Laut"
from Kupang -> Jakarta : 5 days (120 hours)

04 Transportation Stress

Weight loss : 9-12 % (PPHNak 2019; Permana 2018)

The objective was to investigate the effect of sea transport on the physiological responses of cattles

HYPOTESIS

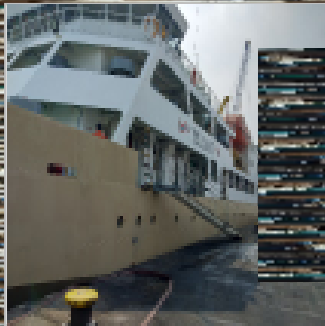


Effect of Sea
Transport on
physiological, blood
sample, dan also
Temperature
Humidity Index (THI)

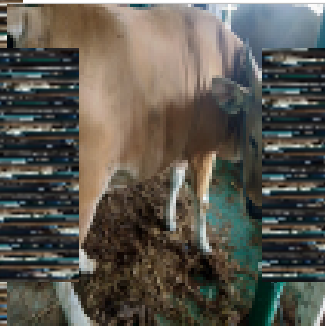


Daily Temperatures (°C)
and relative humidity
(RH%), Bodyweight, Heart
Rate, Respiratory rate,
Rectal body temperature,
glucose, haemoglobin,
ratio neutrophil /
lymphocyte

METHODOLOGY



December 2018 -
January 2019 at
Camara
Nusantara ship
3th



12 Cattles
3 decks (A,B,C)
Physiological
status and Body
weight
THI



Blood sampling
from auricular
vein for Glucos,
Haemoglobin
and ratio N/L



Data were
analyzed by
using
descriptive and
the differences
were tested
using T-Test.

LITERATURE REVIEW



➤ Live Body Weight using Quetelet Formula
 $P [kg] = T^2 \times C \times 87.5$

➤ Temperature Humidity Index (Bulitta et al. 2015)
 $THI = 0.8T$

➤

Nilai THI	Kategori Stres
≤ 74	Normal
75 – 78	Stres Ringan
79 – 83	Stres Sedang
≥ 84	Stres Berat

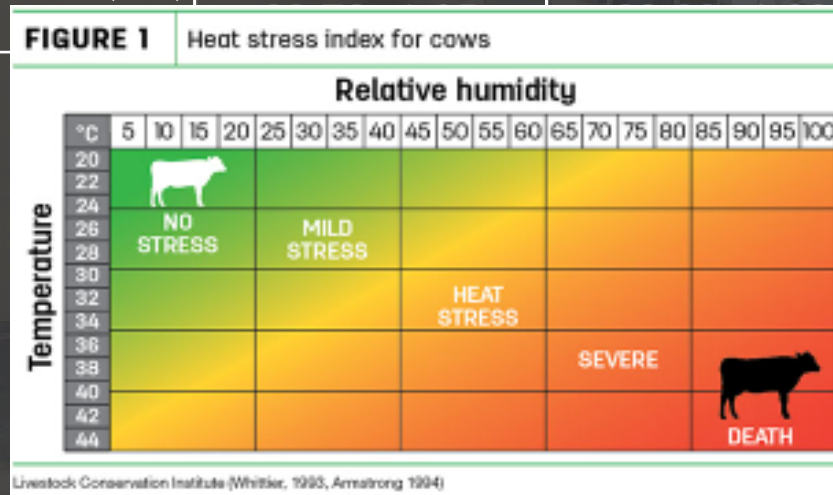
(Bulitta et al. 2015)

RESULTS

Tabel 2 Temperature, Relative humidity, dan THI

Parameter	Normal Range	TIME		Stress Category
		DAY 1	DAY 5	
Temperature (°C)	25-37	30.28±0.51 ^a	30.66±0.79 ^b	Heat Stress Severe (Suprayogiet <i>al.</i> 2013)
Relative Humidity (%)	60-80	82.77±2.63 ^a	76.26±3.42 ^b	
THI				

Within a column means with a common superscript 'a', 'b' letter differ (P<0.05).



RESULTS

Tabel 2 Physiological Parameters of Cattle Transported from Kupang to Jakarta

Parameters	N	Normal Range	Time	
			Day 1	Day 5
Live Body Weight (kg)	12		219.00±24.67 ^a	208.50±26.37 ^b
Heart Rate (beats/min)	12	40-70	71.56±8.92 ^a	62.00±2.30 ^b
Respiratory Rate (beats/min)	12	18-34	21.11±5.76	20.11±2.86
Suhu Rektal (°C)	12	38.0-39.3	38.63±0.33 ^a	38.12±0.17 ^b
Saturasi Oksigen (%)	12	> 95	83.00±15.61	84.58±8.53

Within a column means with a common superscript 'a', 'b' letter differ (P<0.05).

(Kubkomawa *et al.* 2015)

(Aritonang *et al.* 2017)

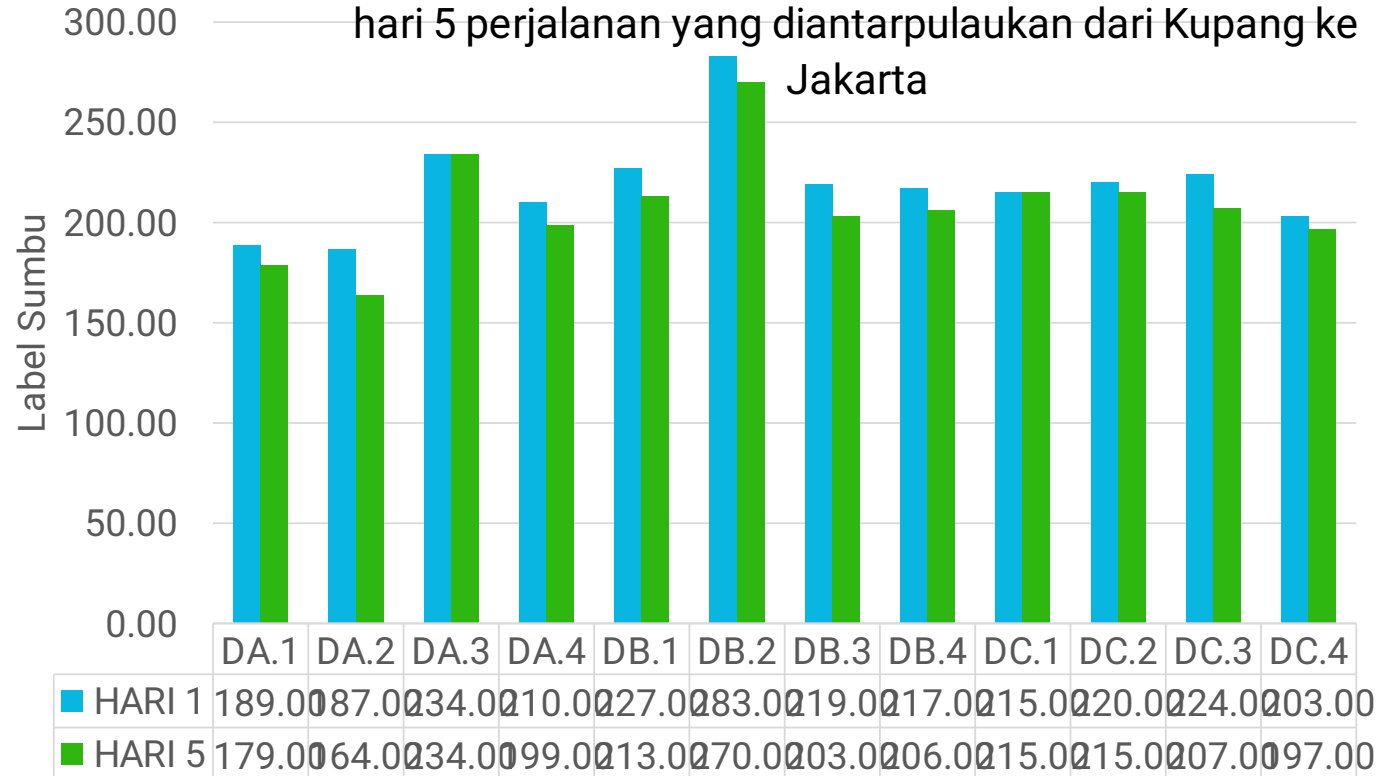
(Jacson dan Cockcroft 2002)

(Cunningham 1992)

RESULTS

Weight loss
 10.5 ± 1.70 kg atau 4.95 ± 1.34 %

Grafik 1. Perbandingan bobot badan sapi saat hari 1 dan hari 5 perjalanan yang diantarpulaukan dari Kupang ke Jakarta



Live Body Weight (kg)	12	DAY 1	DAY 5
		219.00 ± 24.67^a	208.50 ± 26.37^b

Within a column means with a common superscript 'a', 'b' letter differ (P<0.05).

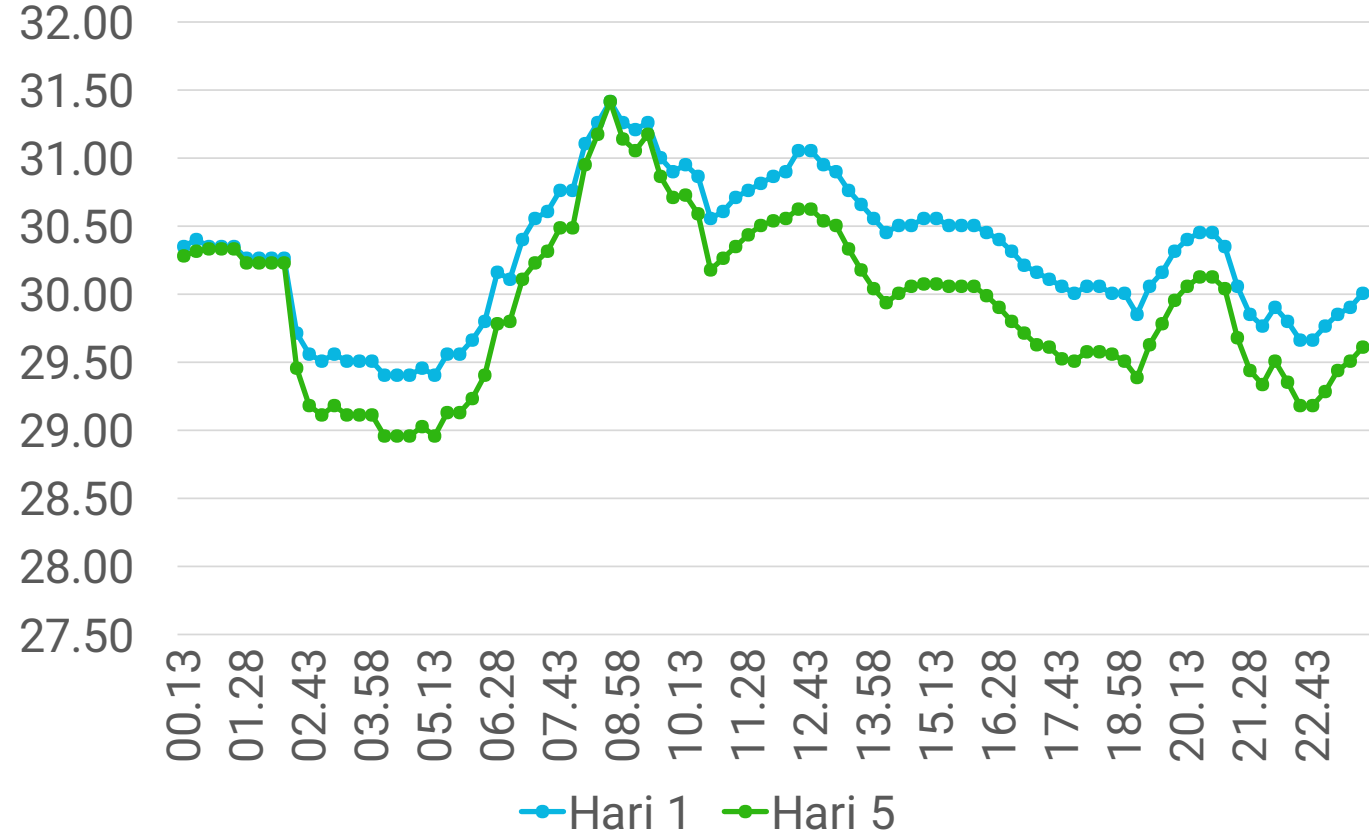
There was difference in live body weight (P<0.05)

Permana (2018) weight loss 15-20 % dan Anton et al. (2016) 17.22%

Long Transportation stress and production performance (Sudrajad&Adiarto 2012)

RESULTS

Grafik 2. Perbandingan suhu lingkungan dek saat hari 1 dan hari 5 perjalanan yang diantarpulaukan dari Kupang ke Jakarta



Temperature (°C)	25-37	30.28±0.51 ^a	30.66±0.79 ^b
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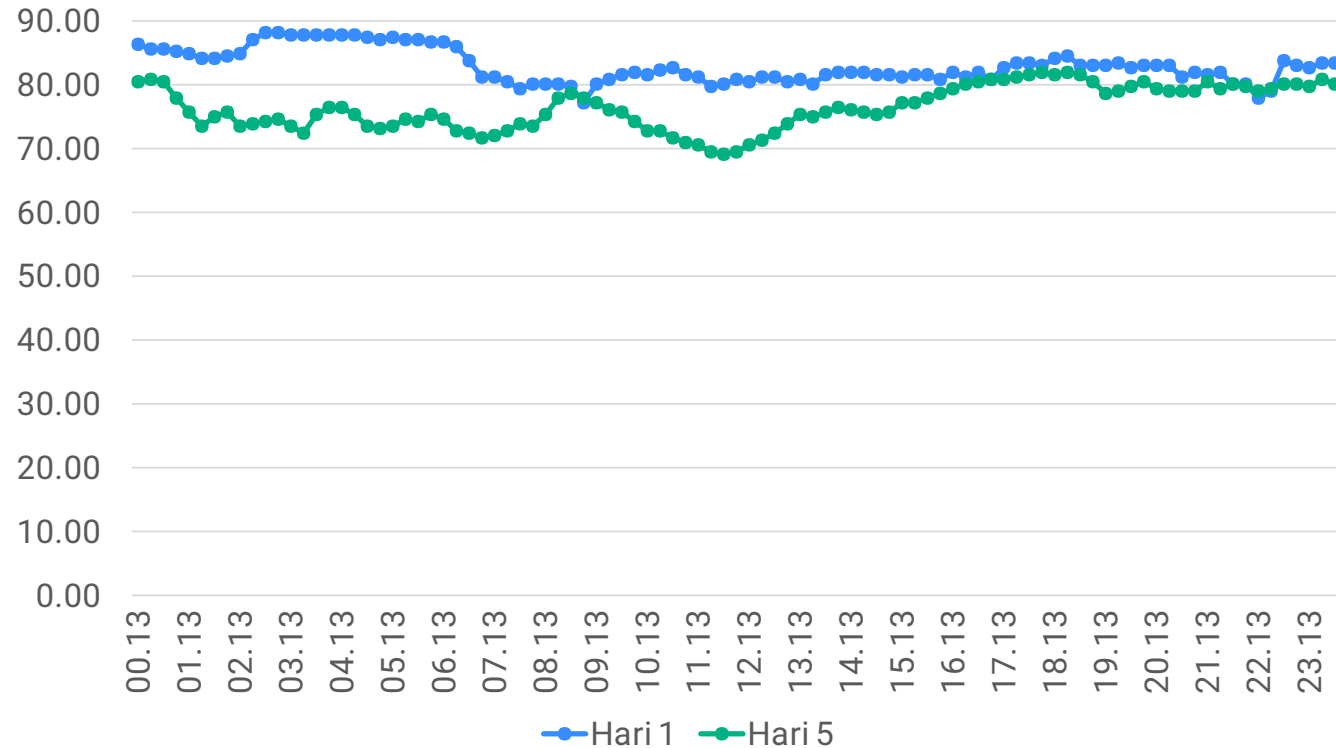
Within a column means with a common superscript 'a', 'b' letter differ (P<0.05).

There was difference in temperature (P<0.05)

EFSA (2004) Temperature maximum 27 °C

RESULTS

Grafik 3. Perbandingan kelembapan relatif dek saat hari 1 dan hari 5 perjalanan yang diantarpulaukan dari Kupang ke Jakarta



Kelembapan (%)	60-80	82.77±2.63^a	76.26±3.42^b
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Within a column means with a common superscript 'a', 'b' letter differ (P<0.05).

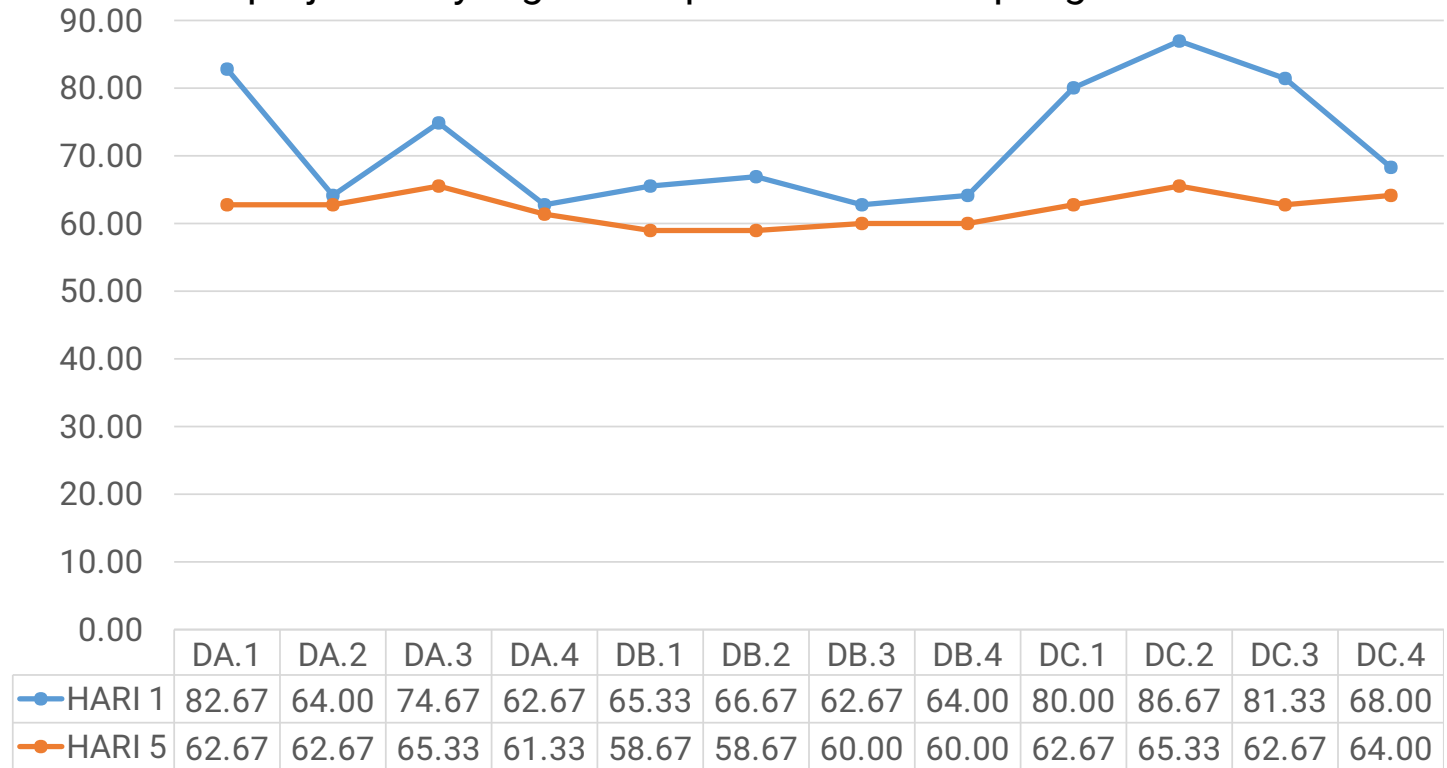
There was difference in relative humidity (P<0.05)

EFSA (2004) Relative humidity maximum 80%

THI > 82 Heat stress-severe (Bulitta et al . 2015)

RESULTS

Grafik 4. Perbandingan frekuensi jantung saat hari 1 dan hari 5 perjalanan yang diantarpulaukan dari Kupang ke Jakarta



Frekuensi Jantung (kali/ menit)	12	40-70	71.56±8.92^a	62.00±2.30^b
<small>Means with a common superscript 'a', 'b' letter differ (P<0.05).</small>				

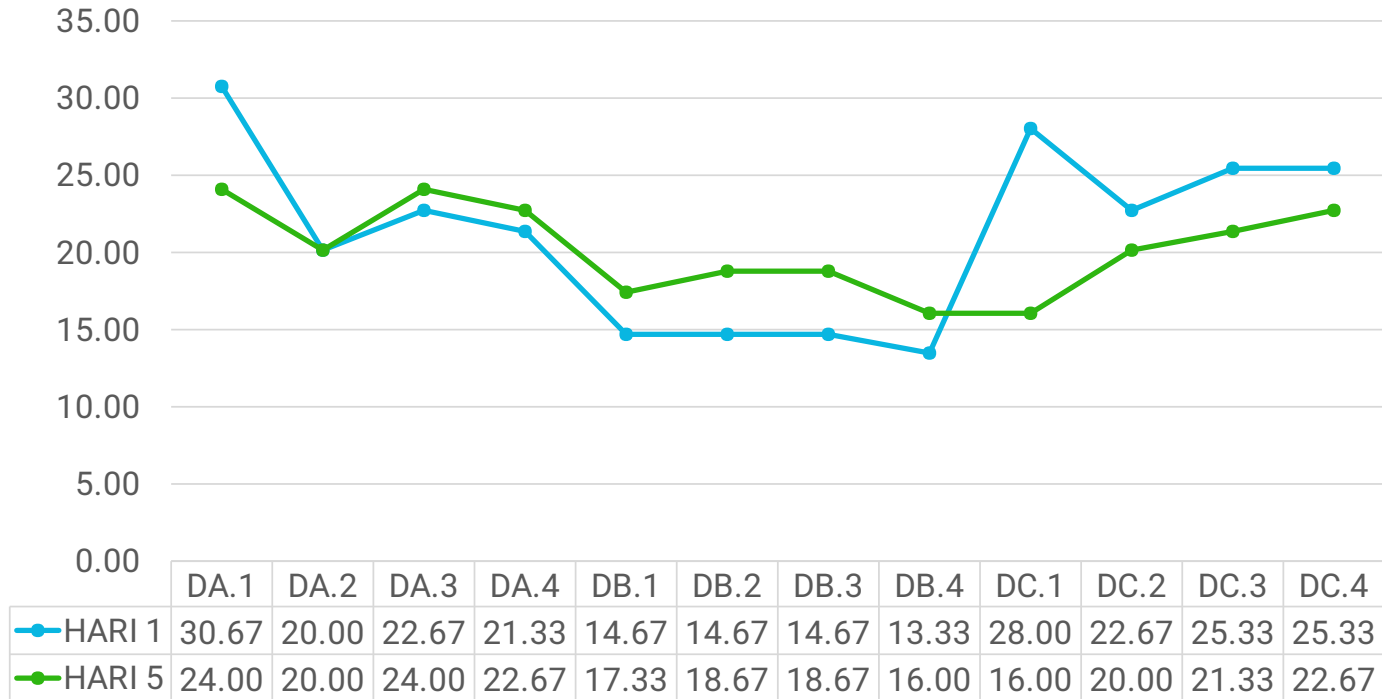
(Kubkomawati et al., 2015)

There was difference in heart rate (P<0.05)

Homeostatic and vasokonstriksi blood vein to evaporate (Reece et al. 2015).

RESULTS

Grafik 5. Perbandingan frekuensi napas saat hari 1 dan hari 5 perjalanan yang diantarpulaukan dari Kupang ke Jakarta



Frekuensi Napas (kali/menit)	12	18-34	21.11±5.76	20.11±2.86
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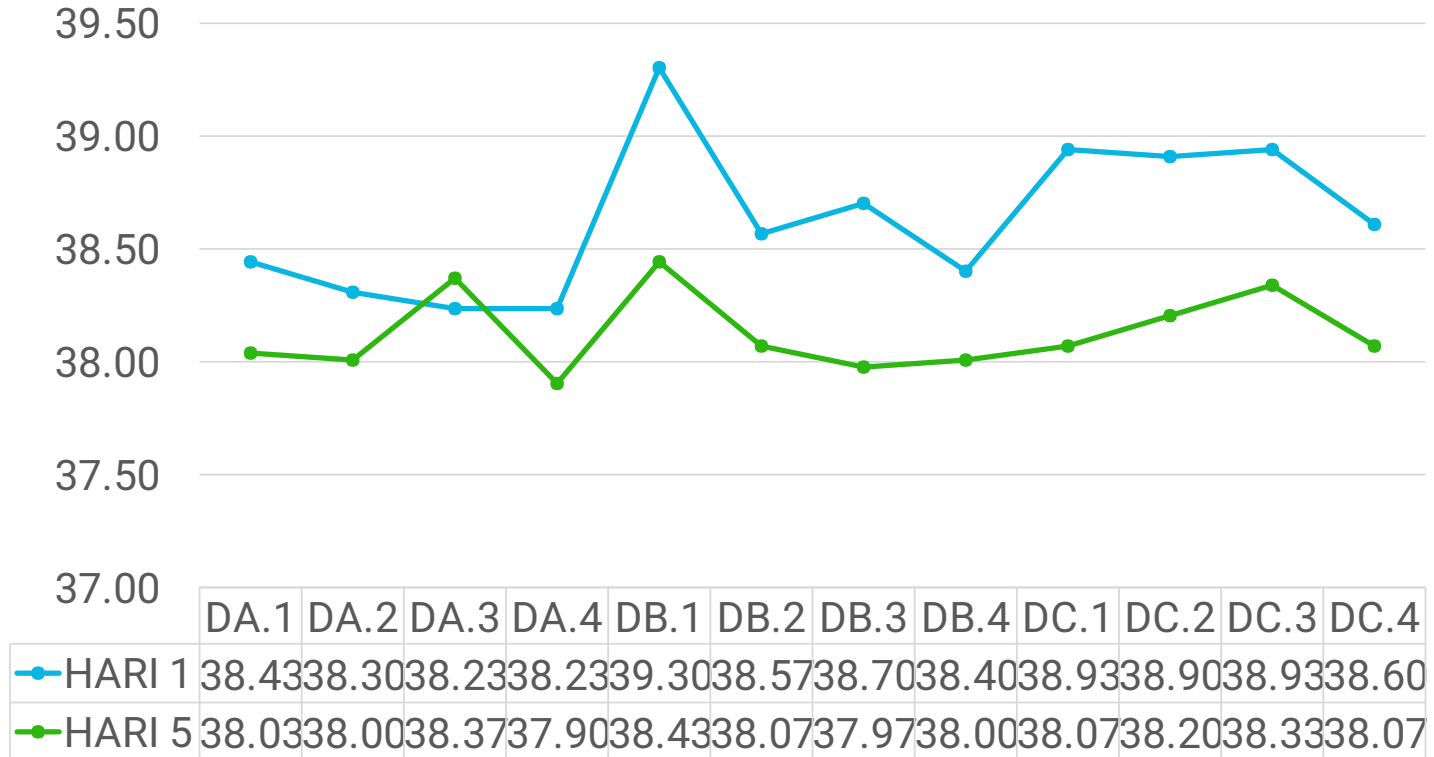
Within a column means with a common superscript 'a', 'b' letter differ (P<0.05).

(Aritonang *et al.* 2017)

There was no difference in heart rate (P>0.05)

RESULTS

Grafik 6. Perbandingan suhu rektal saat hari 1 dan hari 5 perjalanan yang diantarpulaukan dari Kupang ke Jakarta



Suhu Rektal (°C)	12	38.0-39.3	38.63 ± 0.33^a	38.12 ± 0.17^b
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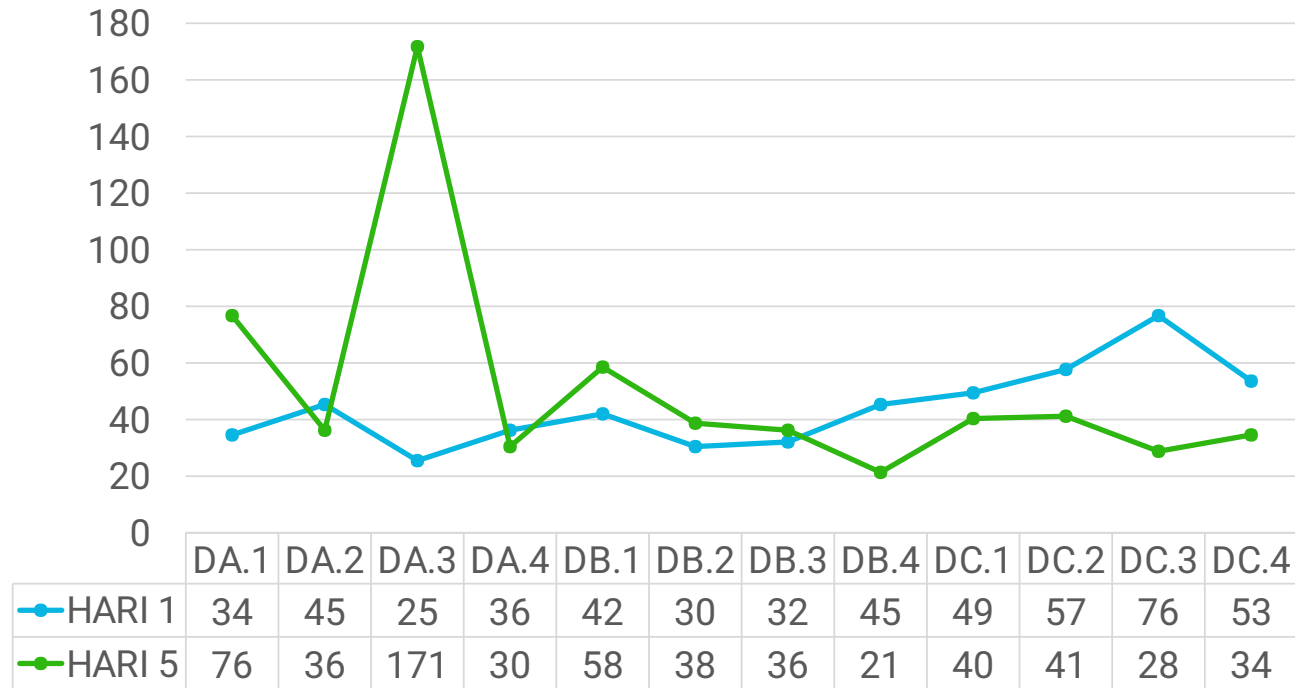
Within a column means with a common superscript 'a', 'b' letter differ (P<0.05).

(Jacson dan Cockcroft 2002)

There was difference in rectal body temperature (P<0.05)

RESULTS

Grafik 7. Perbandingan glukosa saat hari 1 dan hari 5 perjalanan yang diantarpulaukan dari Kupang ke Jakarta



Glukosa (mg/dL)	12	45-75	45.36±13.37	39.82±15.16
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Within a column means with a common superscript 'a', 'b' letter differ (P<0.05).

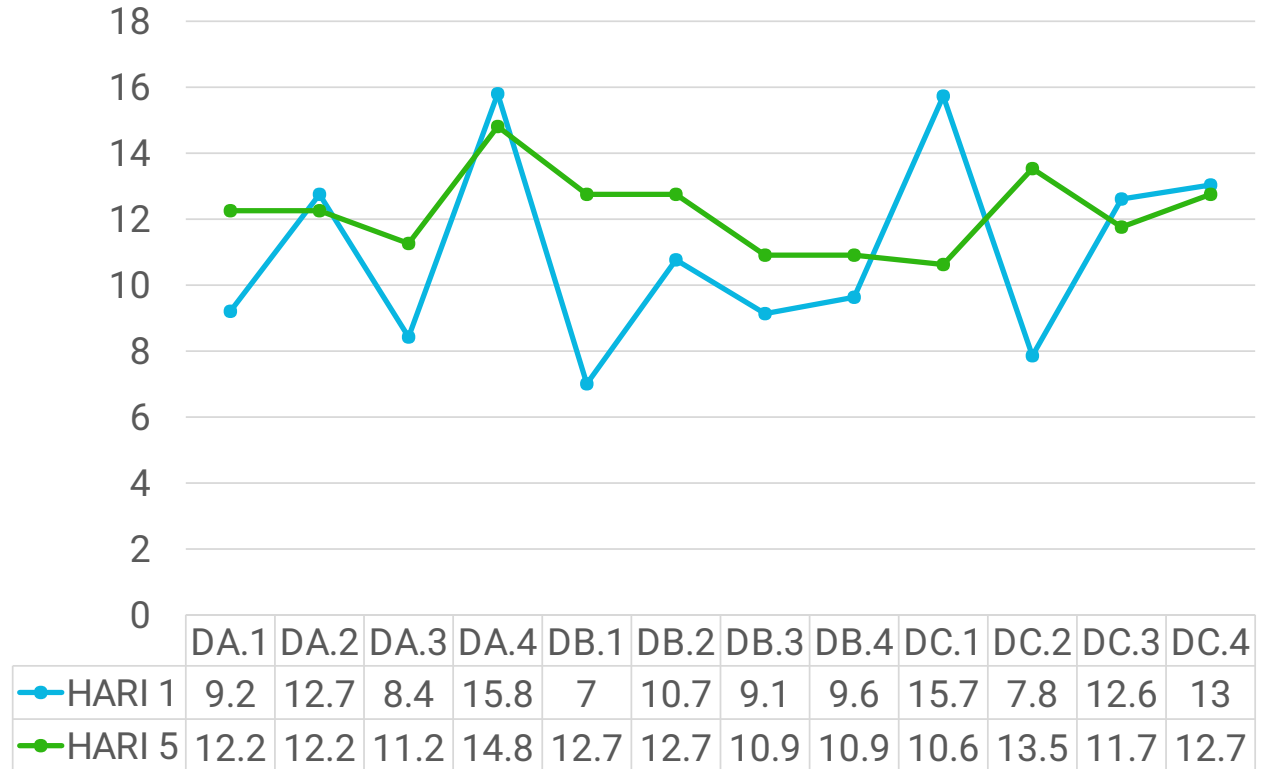
(Jacson dan Cockcroft 2002)

There was no difference
glucose(P>0.05)

Decreasing blood glucose due
to heat stress, transportation
stress

RESULTS

Grafik 8. Perbandingan hemoglobin saat hari 1 dan hari 5 perjalanan yang diantarpulaukan dari Kupang ke Jakarta



Hemoglobin (g/dL)	12	7.4-9.6	10.97±2.96	12.18±1.22
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Within a column means with a common superscript 'a', 'b' letter differ (P<0.05).

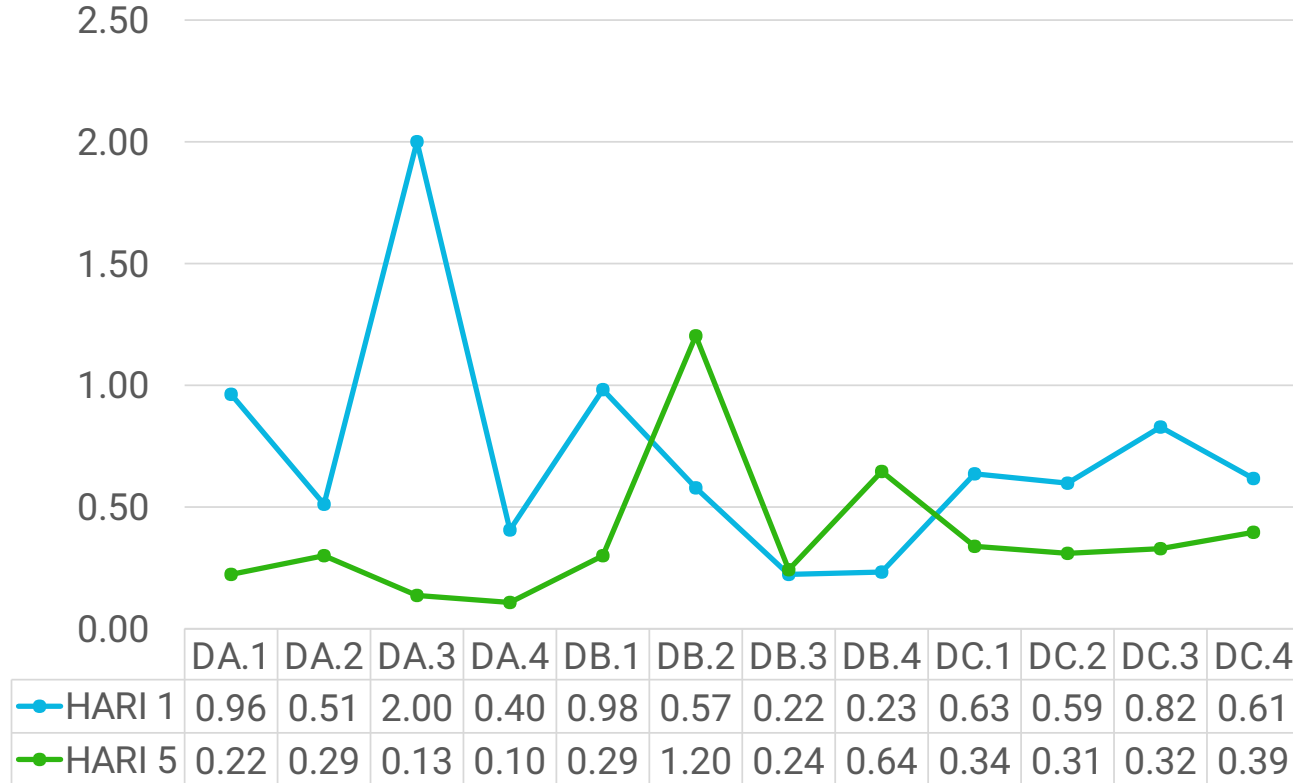
(Siswanto 2011)

There was no difference
haemoglobin (P>0.05)

Cattle still adaptive with
environment of Camara Nusantara
ship

RESULTS

Grafik 8. Perbandingan rasio N/L saat hari 1 dan hari 5 perjalanan yang diantarpulaukan dari Kupang ke Jakarta



Rasio N/L	12	1.13-1.59	0.71±0.47	0.37±0.08
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Within a column means with a common superscript 'a', 'b' letter differ (P<0.05).

(O'Driscolet *al.* 2009)

There was no difference ratio N/L (P>0.05)

CONCLUSIONS



THI > 82 Heat Stress-
Severe



Ratio N/L < 1 No Stress



Weight Loss 10.5 ± 1.70 kg
atau 4.95 ± 1.34 %.

DISCUSSION



TERIMAKASIH



HATUR NUHUN



MATUR SUWUN

