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Zebra: more than just stripes

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SARChI
MEAT SCIENCE
GENOMICS TO NUTRIOMICS



Outline



- Subspecies
- Typical uses
- Consumer expectations
- Carcass composition & yields
- Meat quality
- Value addition
- Conclusions
- Recommendations





Introduction



- **Zebra: 4 sub-species**
 - *Equus grevyi* (Grevy's zebra)
 - *Equus hartmannae* (Hartmann's zebra, Hartmann's mountain zebra)
 - *Equus zebra* (Cape mountain zebra, Mountain zebra)
 - *Equus quagga* (Plains zebra)



Equus grevyi (Grevy's zebra)



Source: www.nature.ca



Equus grevyi (Grevy's zebra)





Equus hartmannae

(Hartmann's mountain zebra)



Source: www.flickr.com



Equus hartmannae

(Hartmann's mountain zebra)





Equus zebra

(Cape mountain zebra)





Equus zebra

(Cape mountain zebra)





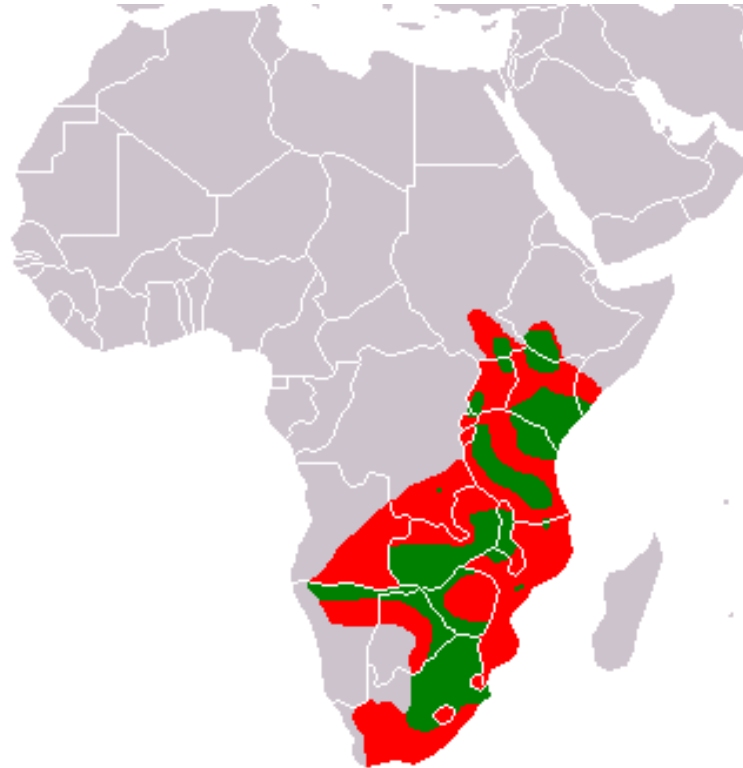
Equus quagga (Plains zebra)



Source: commons.Wikimedia.org



Equus quagga (Plains zebra)





THE QUAGGA PROJECT SOUTH AFRICA

The Quagga Revival

[What is a Quagga?](#)

[What's New?](#)

[The Project](#)

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This project, started in 1987, is an attempt by a group of dedicated people in South Africa to bring back an animal from extinction and reintroduce it into reserves in its former habitat.

Read | [Haley Harvey](#) [Back to Life](#) pdf 216kb

DNA analysis has shown that the Quagga was not a separate species of zebra but in fact a subspecies of the Plains Zebra (*Equus Quagga*). The Quagga, formerly inhabited the Karoo and southern Free State of South Africa. Like other grazing mammals, Quaggas had been ruthlessly hunted. They were seen by the settlers as competitors for the grazing of their livestock, mainly sheep and goats.

By selective breeding from a selected founder population of southern Plains Zebras an attempt is being made to retrieve at least the genes responsible for the Quagga's characteristic striping

STUDBOOK



LATEST QUAGGA NEWS

CNN Inside Africa features the Quagga Project

CNN's Inside Africa recently came to view the Quagga ... [read more](#)

[Watch CNN Inside Africa](#)



Typical uses of zebra



- Historical & modern





Uses



Skin

33-37% of the
total value

9% of live
weight





Uses





Potential as meat



- Biology
 - Breed well
 - Stallion & harem of mares
 - Stallion may kill foals
- Harvest
 - Plains game – easy
 - Found in large units, economically viable
- Diseases
 - Does not get Foot & Mouth Disease



Consumer expectations



- Meat should be:
 - Healthy
 - Wholesome
 - Produced ethically
 - Contain no additives
 - Produced sustainably
 - Processable/value addition





Somes it up!



a few things about our
BURGERS
THEY ARE COOKED to order
WHICH MIGHT TAKE A LITTLE L O N G E R
but it's **WORTH THE WAIT**
SPEAKING OF THAT, YOUR SELECTED 200G IS WHAT YOU GET ON YOUR PLATE (GIVE OR TAKE)
our south african beef is damn good
ANTIBIOTIC FREE WITH NO ADDED HORMONES
(NEVER NEVER NEVER NEVER NEVER NEVER EVER EVER BEEF)
IT'S ^{100%} ONE **NATURALLY RAISED**
HUNDRED ^{AND} PERCENT **HUMANELY HANDLED**
we prefer medium BUT IF YOU LIKE IT
MOOING CHARRED OR SOMEWHERE IN BETWEEN



The Zebra



- Harvested in field
 - Boma
 - From helicopter
 - From specialised motor vehicle
- Due to value of skin, transported with skin on from field to breaking/processing plant
- Data on 20 Burchell's zebra
- Carcass weights: 106-190 kg



Yields



Component	Weight (kg)	Yield (% of CCWt)
Live weight	321.6	
Cold carcass weight (CCWt)	193.2	
Dress out %		60.1
Hind quarters	66.3	34.3
Fore quarters	36.6	18.9
Ribs	29.2	15.1
Middle	45.4	23.5
Neck	15.7	8.1



Yields



- Data on 20 Burchell's zebra
- Carcass weights: 106-190 kg
- *Longissimus dorsi* muscle removed
 - Homogenised
 - Chemically analysed using standard procedures





Proximate composition (g per 100 g) of *longissimus lumborum* muscle of zebra



($n=20$)

Proximate	Mean	Range
Moisture	76.4 ± 0.77	74.41–77.90
Protein	22.3 ± 0.50	21.39–23.30
Fat	1.5 ± 0.47	1.03–3.10
Ash	1.1 ± 0.07	1.01–1.26

SD, standard deviation.



Fatty acids



- Hind gut fermenters
- Expect FA profile to be similar to that of diet
 - The FA content of grasses is fairly low:
 - C18 polyunsaturated fatty acids (PUFAs) generally dominate in the form of α -linolenic acid (ALA; C18:3 n -3) and linoleic acid (LA; C18:2 n -6), with palmitic acid (C16:0) forming a smaller proportion.



Fatty acids (IMF)



- PUFAs: 5.86 mg g⁻¹, 41.15%
- SFAs: 5.84 mg g⁻¹, 41.01%
- MUFAs; 2.75 mg g⁻¹, 17.84%
 - palmitic acid (C16:0; 3.48 mg g⁻¹, 24.03%),
 - LA (C18:2 n -6 c ; 3.27 mg g⁻¹, 23.41%),
 - oleic acid (C18:1 n -9 c ; 2.45 mg g⁻¹, 15.88%),
 - stearic acid (C18:0; 1.96 mg g⁻¹, 14.06%),
 - ALA (C18:3 n -3; 1.77 mg g⁻¹, 11.78%)
- EPA & DHA low but higher than in beef, lamb, pork chicken



Processing of Zebra



- Compared salami produced from springbok (*Antidorcas marsupialis*), gemsbok (*Oryx gazella*), kudu (*Tragelaphus strepsiceros*) and zebra (*Equus burchelli*) harvested in Namibia





Physical & Consumer



- pH of the salami differed ($p < 0.05$) with springbok salami having the highest mean pH value.
- No differences ($p > 0.05$) were observed among the species for aw, shear force, gumminess or cohesiveness.
- The most distinctive characteristics DSA: smoky, salty, pepper and salami flavour, combined with a smoky, salami aroma.
 - Game flavour was not perceived as a strong attribute
- Gemsbok salami was strongly associated with the attribute colour as described by the male and female consumer panels.
- The springbok salami scored the lowest for both colour and taste.
- Salami produced from gemsbok, kudu and zebra were superior to springbok salami.



Conclusions



- Zebra is of the healthiest meat tested
- Ideal for value addition





Thank you



- **Papers cited:**

- Hoffman, L.C., Geldenhuys, G. & Cawthorn, D.-M. (2016). Proximate and fatty acid composition of zebra (*Equus quagga burchellii*) muscle and subcutaneous fat. *Journal of the Science of Food and Agriculture*, **96**(11), 3922-3927.
- Van Schalkwyk, L., McMillin, K.W., Booyse, M., Witthuhn, R.C. & Hoffman, L.C. (2010). Physico-chemical, microbiological, textural and sensory attributes of matured game salami produced from springbok (*Antidorcas marsupialis*), gemsbok (*Oryx gazella*), kudu (*Tragelaphus strepsiceros*) and zebra (*Equus burchelli*) harvested in Namibia. *Meat Science*, **88**(1), 36-44.



- **Any Questions?**