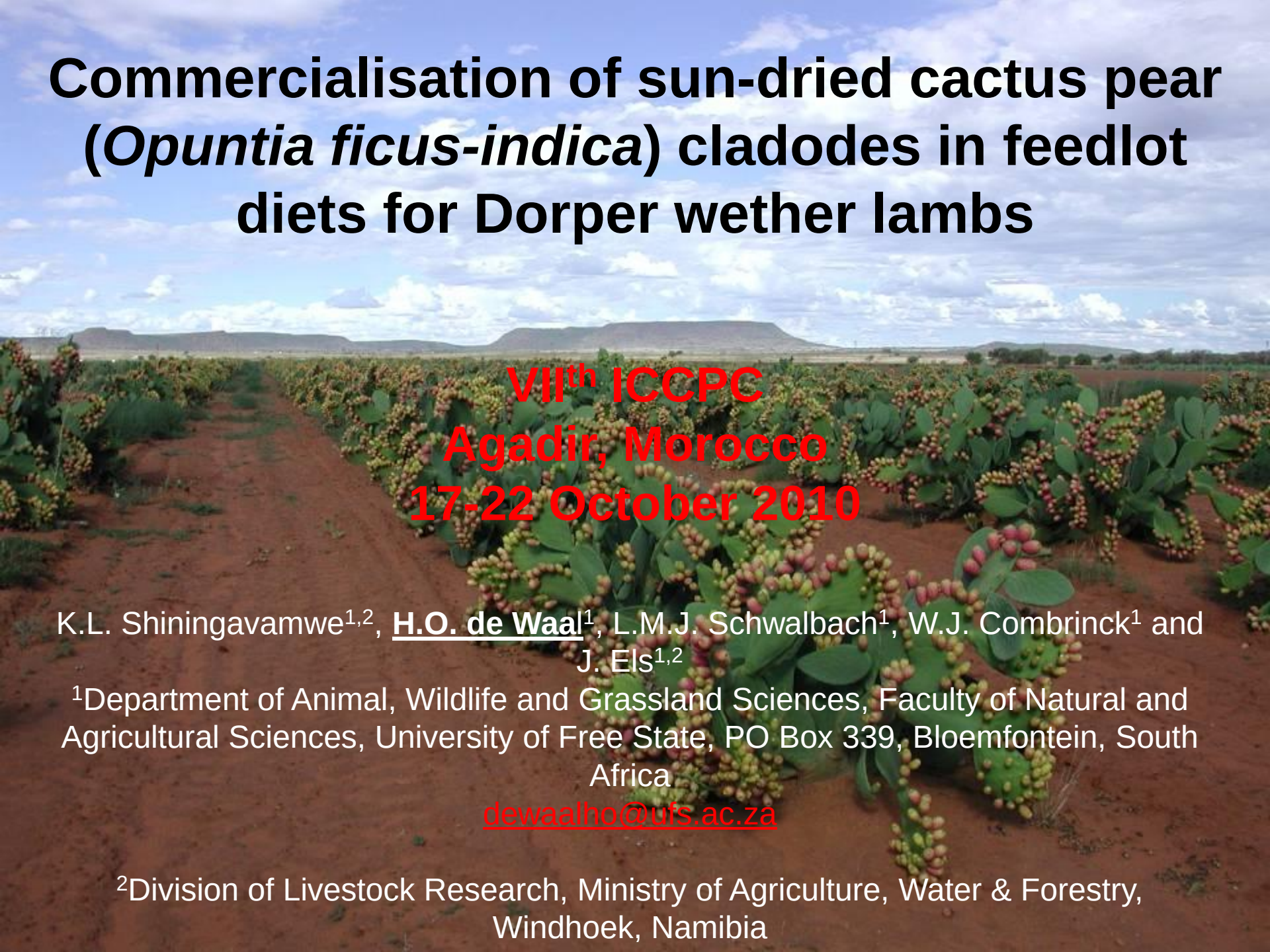
Commercialisation of sun-dried cactus pear (*Opuntia ficus-indica*) cladodes in feedlot diets for Dorper wether lambs



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K.L. Shiningavamwe[1,2], **H.O. de Waal**[1], L.M.J. Schwalbach[1], W.J. Combrinck[1] and J. Els[1,2]

[1]Department of Animal, Wildlife and Grassland Sciences, Faculty of Natural and Agricultural Sciences, University of Free State, PO Box 339, Bloemfontein, South Africa

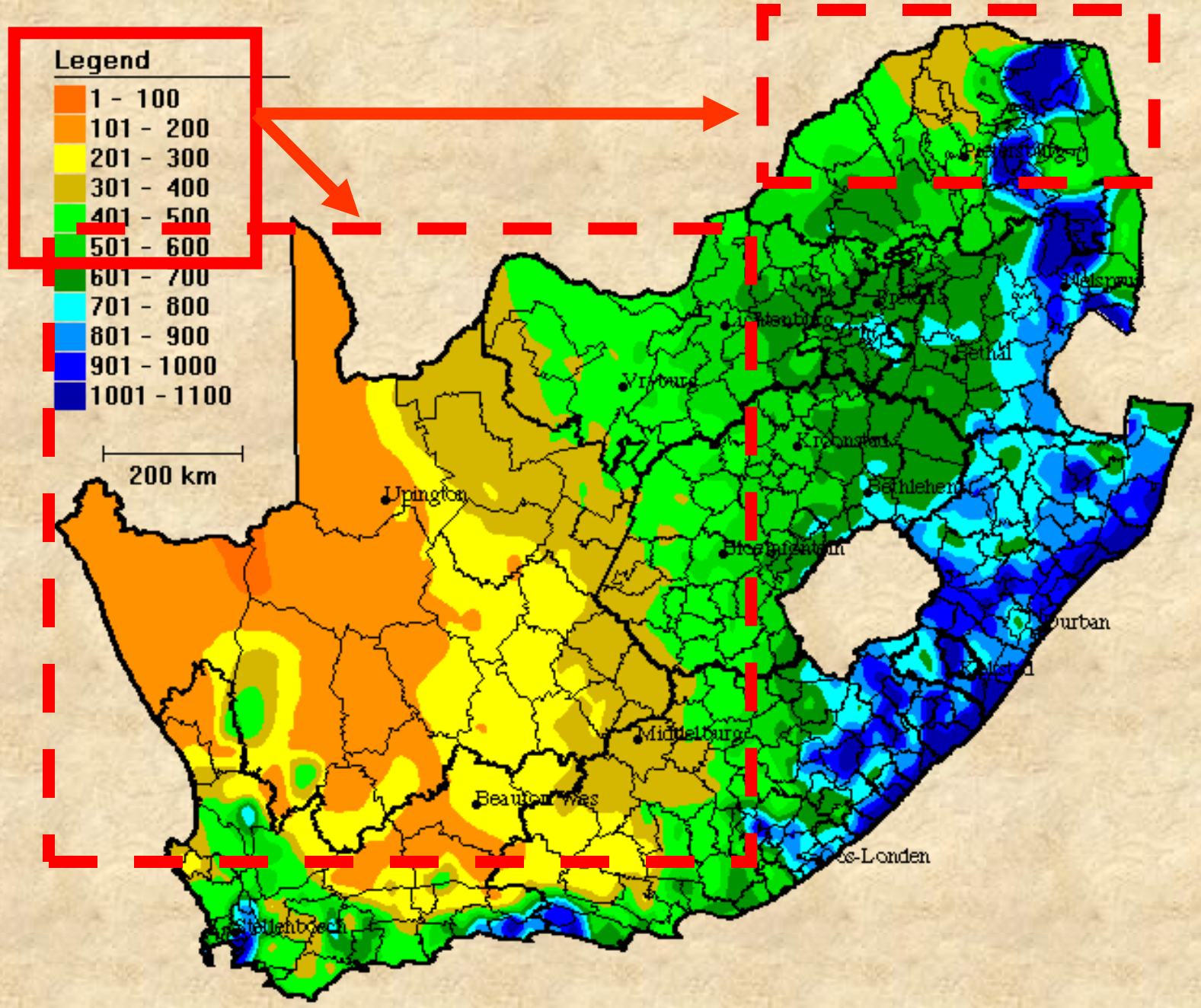
dewaalho@ufs.ac.za

[2]Division of Livestock Research, Ministry of Agriculture, Water & Forestry, Windhoek, Namibia

A very common view of *Opuntia*

***Opuntia* was officially promoted as a fodder bank for livestock during recurring droughts in South Africa**

Renewable water resource - long-term annual rainfall (mm)



Opuntia ficus-indica

Very efficient user of water

Renewable plant production - photosynthesis

High dry matter yields per unit area

Fruits - 25 000 to 30 000 kg fresh fruits / ha

Cladodes - 100 000 kg fresh cladodes / ha
(Cladodes pruned to improve fruit quality)

Cladodes - 200 000^{plus} kg fresh cladodes / ha
(Cladodes harvested as animal feed *)

* Yields depend on harvesting cycles (annual or tri-annual?)

Water use efficiency (WUE)

***Opuntia* is:**

1.14 x more efficient than **Old man saltbush** (*Atriplex nummularia)*

2.8 x more efficient than **wheat** (*Triticum vulgare*)

3.75 x more efficient than **lucerne** (*Medicago sativa*)

7.5 x more efficient than **rangeland vegetation**

(De Kock, 1980; Azócar, 2001)

- ***Opuntia***
  - Human consumption
  - Animal consumption
    - Fruit
      - Fresh
        - Balanced diets/ Feed pellets
      - Sun-dried
    - Cladodes
      - Processed
        - Sun-dried
          - Coarsely ground
            - Balanced diets/ Feed pellets
        - Silage
  - Biotech applications

Conclusions – reached by Menezes (2008)

With incremental inclusion levels (0, 24 and 36%) of sun-dried and coarsely ground *Opuntia ficus-indica* var. Algerian cladodes in production diets for sheep …

The daily feed intake and water intake for diets were not significantly influenced by inclusion of sun-dried and coarsely ground *Opuntia* cladodes.

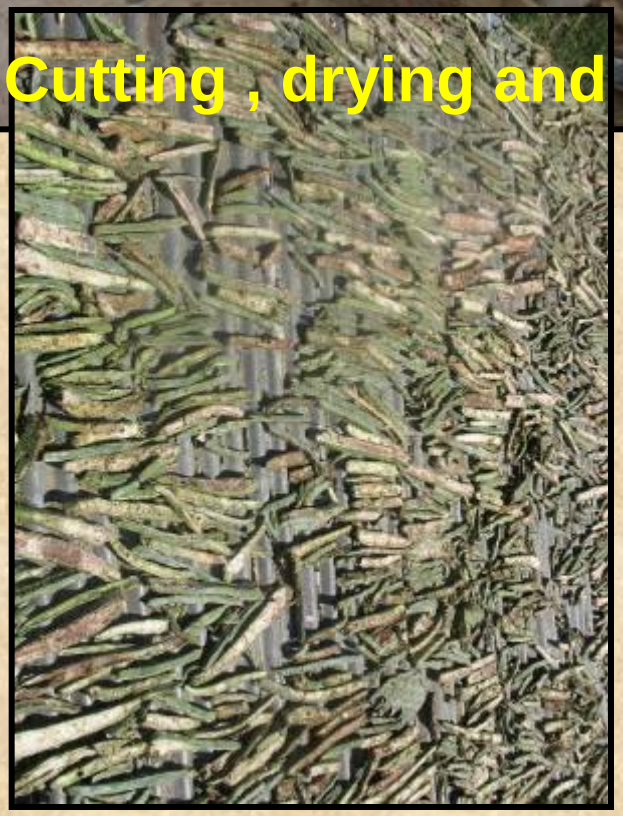
Daily urine excretion showed no significant differences between treatments diets.

Inclusion of sun-dried *Opuntia* cladodes in the diets resulted in the production of wet faeces within days, due to the presence of mucilage in cactus pear.

Despite aesthetical aspects no detrimental effects were noted in the sheep. The faeces also lacked the typical foul odours associated with diarrhoea.

…thus opening the way for production studies in feedlots

Forty-five Dorper wether lambs, weighing on average about 22 kg, were randomly allocated to three treatment diets; the 15 lambs per treatment diet were further subdivided into three subgroups or replicates of five lambs each. [Namibia]



Cutting , drying and processing cactus pear cladodes

Mixing diets and feeding weaned Dorper wether lambs

Composition of three treatment diets fed to Dorper wether lambs

(Katrina Lugambo Shiningavamwe, 2009)

	Treatment diets*		
Feed ingredient (kg air dry)	**T0**	**TI**	**T2**
Sun-dried and coarsely ground *Opuntia* cladodes	**-**	**330**	**300**
Coarsely ground lucerne hay	**577**	**255**	**190**
Yellow maize meal	**358**	**340**	**275**
Feed grade urea	**10**	**20**	**-**
Sunflower oilcake meal	**-**	**-**	**180**
Molasses meal (Enermol)	**40**	**40**	**40**
Feed lime	**15**	**15**	**15**

* T0 - conventional feedlot diet; *Opuntia*-based diets T1 & T2 – 330 and 300 g/kg sun-dried and coarsely ground *Opuntia* cladodes, with different nitrogen sources (T1 – NPN and T2 – Natural protein)

Performance of the Dorper wether lambs during the feeding period in the feedlot and the cost of three treatment diets

(Katrina Lugambo Shiningavamwe, 2009)

	Treatment diets *				
Variable	T0	T1	T2	P	CV[1]%
Initial live body weight (kg)	21.23±0.55[a]	21.13±0.46[a]	21.67±0.50[a]	0.730	9.13
Final live body weight (kg)	35.46±0.11[a]	32.43±0.53[a]	35.60±0.64[a]	0.057	11.0
Total weight gain (kg)	13.90±0.41[a]	11.30±0.09[a]	13.93±0.32[a]	0.064	25.6
Average daily weight gain (ADG) (g)	180.6±3.7[a]	125.4±0.8[b]	181.0±2.9[a]	<0.001	24.6
Feed intake (kg DM/day/head)	1.147±0.050[a]	1.131±0.071[a]	1.209±0.022[a]	0.538	7.3
FCR (kg DM intake/kg gain)	6.07±0.73[b]	8.25±0.27[a]	6.11±0.16[b]	0.036	10.9
Cost of diet/kg (N$)	3.14±0.01[a]	2.42±0.02[b]	2.70±0.01[b]	0.001	0.9
Cost of diet/head/day (N$)	3.71±0.18[a]	2.73±0.19[b]	3.26±0.01[b]	0.007	5.7

*T0 - conventional feedlot diet; *Opuntia*-based diets T1 & T2 – 330 and 300 g/kg sun-dried and coarsely ground *Opuntia* cladodes, with different nitrogen sources (T1 – NPN and T2 – Natural protein)

[a,b] Means with different superscripts within a row are significantly different (P < 0.05)

[1] Coefficient of variance

Conclusions – based on feedlot trials

Natural protein (sunflower oilcake meal) improved the nutritive value of an *Opuntia*-based diet and promoted better growth of Dorper wether lambs compared to those on an *Opuntia*-based diet balanced with an NPN source (feed grade urea).

Dorper wether lambs fed the *Opuntia*-based diet supplemented with NPN had a lower growth rate than those fed the conventional feedlot diet and the *Opuntia*-based diet supplemented with natural protein – age and development of lambs vs. older sheep.

These results opened the prospect of formulating affordable *Opuntia*-based diets for application to ruminant species of different ages and production classes.

More research is needed on the growth performance, carcass characteristics and profitability of other small livestock breeds/ruminant/monogastric species fed sun-dried and coarsely ground *Opuntia* cladodes in feedlot diets, balanced with different nitrogen sources.

Thank you

Baie dankie