MSA: INVENTORY OF DAIRY RELATED R & D IN SOUTH AFRICA 2013-2015.

1. **AGRICULTURAL RESEARCH COUNCIL - API:**

   Claude Muya:

   Projects:

- Effect of dietary concentrate level and live yeast on rumen fermentation, microbial protein synthesis and milk yield in dairy cows. Agricultural research Council-Animal Production Institute.

- Evaluation of risk of metabolic diseases in small scale Jersey farm in Limpopo province of South Africa. Agricultural research Council-Animal Production Institute.

- Effects of commercial and crude plant extracts on in vitro ruminal fermentation and nutrients digestibility. Agricultural research Council-Animal Production Institute.

- Immunoglobulin response and growth performance of newborn Holstein calves fed garlic (Allium Sativum) powder and probiotics as feed additives. Agricultural research Council-Animal Production Institute.

Cuthbert Banga:

Scientific Publications:

- N.I. Ramatsoma, C.B. Banga, M.D. MacNeil & A. Maiwashe, 2014. Evaluation of genetic trends for traits of economic importance in South African Holstein cattle. S.Afr. J. Anim. Sci. 44, 85-89.

- C.B. Banga, F.W.C. Neser & D.J. Garrick, 2014. The economic value of somatic cell count in South African Holstein and Jersey cattle. S.Afr. J. Anim. Sci. 44, 173-177.

- C.B. Banga, F.W.C. Neser & D.J. Garrick, 2014. Breeding objectives for Holstein cattle in South Africa. S.Afr. J. Anim. Sci. 44, 199-214.

- V.E. Imbayarwo-Chikosi, K. Dzama, T.E. Halimani, J.B. van Wyk, A. Maiwashe & C.B. Banga, 2015. Genetic prediction models and heritability estimates for functional longevity in dairycattle. S. Afr. J. Anim. Sci. 45, 105-121.

Michiel Scholtz:

- Scholtz, MM, Du Toit, J & Neser, FWC., 2014. Antagonism in the carbon footprint between beef and dairy production systems. S. Afr. J. Anim. Sci. 44, 17-20.

2. **EASTERN-CAPE: DÖHNE:** Jean Rust

   Projects:

- Benchmark project - profiling communal household milk production in districts of the Eastern Cape.

- Once a day milking as a system for emerging farmers.

- Eastern Cape Livestock Development Project: Masters study with Fort Hare under the supervision of John Mupangwa, with the title: *Characterisation of the production and consumption of milk in the communal livestock production sector of the Eastern Cape Province.*

3. **FORT HARE:** Voster Munchenje
   Research Theme: Pasture-based milk production and milk characteristics.

   Projects:

   - Feeding combinations of clover, rye grass, kukuyu, concentrates and silage
   - Investigating milk production and milk mineral, somatic cell count and fatty acid profiles of milk
   - Cow milking characteristics, milking time, milk conductivity in relation to mastitis conductivity
   - Animal welfare and milk production

   Scientific Publications:

   - N. W.T. Carlos, V. Muchenje & A. Hugo. (2014). Atherogenicity index and health-related fatty acids in different stages of lactation from Friesian, Jersey and Friesian × Jersey cross cow milk under a pasture-based dairy system. Food Chemistry, 146: 127-133.

   - N. W.T. Carlos and V. Muchenje. (2013). Winter and spring variation in daily milk yield and mineral composition of Jersey, Friesian cows and their crosses under a pasture-based dairy system. S. Afr. J. Anim. Sci. 43 (Issue 5, Supplement 1): 17-21.

   - N. W.T. Carlos and V. Muchenje. (2015). Milk yield, somatic cell counts and milk mineral profiles in pasture-based Friesian, Jersey and Friesian × Jersey cows in different stages of lactation. Submitted to Journal of Dairy Science.

   Conference Presentations:

   - N.W.T. Carlos & V. Muchenje. (2013). Effect of breed, parity, days-in-milk and milking time on daily milk yield and electrical conductivity in pasture-based dairy cows. Paper presented at the 46th South African Society for Animal Science (SASAS) Congress, 23rd -26th June 2013, Bloemfontein, Free State, RSA.

   - Z Mpisana & V Muchenje, 2015. Behavioural assessment of three genotypes of primiparous and multiparous dairy cows around calving time on a pasture based dairy system. Paper presented at the 48th SASAS Congress, 21-23 September 2015, Empangeni, KZN.

4. **KWA-ZULU NATAL:**
   ALLERTON VETERINARY LABORATORY:
   Scientific Publications:

- T. SCHMIDT, M. M. KOCK AND M. M. EHLERS, 2015. Diversity and antimicrobial susceptibility profiling of staphylococci isolated from bovine mastitis cases and close human contacts. J. Dairy Sci. 98, 6256-6269.

CEDARA:

Projects:

Derryn Nash:

- Accelerated calf rearing on pasture based systems.
- A survey on the energy status of newly calved cows at the Cedara Dairy
- Evaluation of the effect of round-up, soil temperature and soil moisture on the establishment of ryegrass over-sown into kikuyu.
- Evaluation of *Festuca arundinacea* (Tall Fescue) varieties, herbage quality and grazing management to determine suitability as a lower input pasture for dairy systems.

Erika van Zyl:

- Small scale dairying in an integrated farming system.

KOKSTAD:

Sheila Houseman:

- Lucerne cultivar evaluation at Kokstad Research Station.

5. SA STUD BOOK: Japie van der Westhuizen.

Conference Presentations :

- MOSTERT, B.E., 2013. Genetic levels of global Jersey populations. SA Jersey Journal, Vol 63, nr 1, 13-16.
- MOSTERT, B.E., VAN DER WESTHUIZEN, R.R. & VAN DER WESTHUIZEN, J., 2013. ,Assessing genetic levels of foreign sires using MACE. BE Mostert, RR van der Westhuizen & J van der Westhuizen. *46th Nat. Congr. SASAS*, 23-26 June 2013, Bloemfontein.
- BRAND, W., MOSTERT, B.E. & VAN MARLE-KOSTER, E., 2013. The development of standard lactation curves for the South African Jersey breed: A review. *46th Nat. Congr. SASAS*, 23-26 June 2013, Bloemfontein (Poster).
- MOSTERT, B.E., VAN DER WESTHUIZEN, R.R. & VAN DER WESTHUIZEN, J., THERON, H.E. & STEYN, Y., 2013. Genetic parameters for production traits and somatic cell score of Holstein type cattle using multi-trait test-day models. *46th Nat. Congr. SASAS*, 23-26 June 2013, Bloemfontein (Poster).
- MOSTERT, B.E. & VAN DER WESTHUIZEN, R.R., 2013. Development of a Functional Herd Life Genetic Evaluation for Holstein type cattle in South Africa. *46th Nat. Congr. SASAS*, 23-26 June 2013, Bloemfontein (Poster).
- VAN DER WESTHUIZEN, R.R., MOSTERT, B.E. & BERRY, D., 2013. Validation of Genomic EBVs for South African Holstein cattle. *46th Nat. Congr. SASAS*, 23-26 June 2013, Bloemfontein.
- STEYN Y., THERON, H.E., MOSTERT, B.E., VAN DER WESTHUIZEN, R.R. & VAN DER WESTHUIZEN, J., 2013. Alternative measurements for genetic improvement of feed efficiency in South African Bonsmara cattle. *46th Nat. Congr. SASAS*, 23-26 June 2013, Bloemfontein.

- VAN DER WESTHUIZEN, R.R., BERRY, D., MOSTERT, B.E. & VAN DER WESTHUIZEN, J., 2013. Requirements for setting up a reference population for genomic selection. *46th Nat. Congr. SASAS*, 23-26 June 2013, Bloemfontein.
- VAN DER WESTHUIZEN, J., GREYLING, S. & FRANCIS, S.M., 2013. The use of industry wide technical network in ensuring production efficiency in Southern African dairy herds. *46th Nat. Congr. SASAS*, 23-26 June 2013, Bloemfontein.
- GREYLING, S. & FRANCIS, S.M. & VAN DER WESTHUIZEN, J., 2013. The practical application and impact of high level management reports in South African dairy herds. *46th Nat. Congr. SASAS*, 23-26 June 2013, Bloemfontein.
- FALCH, C., VAN DER WESTHUIZEN, J. & GREYLING, S. 2013. Laboratory tests making use of current milk recording practices for diagnoses and simplifying management in dairy herds. *46th Nat. Congr. SASAS*, 23-26 June 2013, Bloemfontein.

Scientific Publications :

- DE PONTE BOUWER, P., VISSER, C. & MOSTERT, B.E., 2013. Analysis of inbreeding of the South African Dairy Swiss breed. Short communication. *S. Afr. J. Anim. Sci.* **43**, 38-43.
- DE PONTE BOUWER, MOSTERT, B.E. & VISSER, C., 2013. Genetic parameters for production traits and somatic cell score of the SA Dairy Swiss population. *S. Afr. J. Anim. Sci.* **43**, 113-122.

Technical Reports :

- MOSTERT, B.E., 2014. Assessment of Linear Type Traits and Inbreeding of the SA British Alpine Population. For : SA Milch Goat Association.
- MOSTERT, B.E., 2014. Assessment of Linear Type Traits and Inbreeding of the SA Saanen Population. For : SA Milch Goat Association.
- Mostert, B.E., 2014. Assessment of Linear Type Traits and Inbreeding of the SA Toggenburg Population. For : SA Milch Goat Association.

Representation of South Africa's Genetic Dairy Evaluations at INTERBULL :

- MOSTERT, B.E., 2013. INTERBULL Meeting, 2013. August 22-25. Nantes, France.
- MOSTERT, B.E., 2014. INTERBULL Meeting, 2014. May 20-22. Berlin, Germany.

Developmental Projects :

- **SA Stud Book Inbreeding Calculator**, 2013. A function has been developed in Logix of SA Stud Book to calculate inbreeding of possible future progeny. This operates on a herd basis, takes the sire and dam lines' complete pedigrees into consideration and is based on all generations' information that is available on Logix. This is therefore the most accurate inbreeding calculator available in South Africa to aid in decreasing the rate of inbreeding of South African dairy populations.
- **SA Stud Book's Genomic Selection Service**, 2013. Logistics has been set-up, collaborations finalised and the Service introduced for aquirement and inclusion of genomic information for more reliable selection purposes of young South African Holstein, Jersey and Ayrshire animals on a routine basis.

- **SA Stud Book's User Defined Management Reports**, 2013-2014. Interactive reports (via Logix Website of SA Stud Book) that :
  - Incorporate professional animal science advice by a Stud Book professional animal scientist
  - Benchmarking reports for comparison with selected herds in the same or other regions of the country
  - Automated Herd Health reports and lists with cows needing treatment for udder health and metabolic disorders (ketosis and acidosis)
  - Functional (linear) type trait report

- **SA Stud Book's Genetic Dairy Herd Reports**, 2013-2014. Genetic summaries on a herd basis that includes the following :
  - General guidelines concerning selection per trait
  - Percentile tables describing variation per trait of the breed
  - Genetic Windows indicating the genetic levels of the active herd in comparison to that of the breed with regards to cows, heifers, sires of cows and sires of heifers
  - Genetic trends indicating the historical genetic changes of the herd in comparison to that of the breed
  - Breeding values and indices for all sires of active cows and heifers of the herd, as well as for young bulls of the herd
  - Breeding values and indices of all active cows and heifers of the herd
  - Selection lists, where top and bottom third of the herd are indicated with regards to the breed's total merit index
  - Top and bottom 10% of animals within the breed per trait are indicated
  - Top ten and bottom ten cows and heifers of the herd are indicated per trait and index
  - Rate of Inbreeding, relative to that of the breed are indicated
  - Inbreeding coefficients of all active cows, heifers, sires used and young bulls are indicated

- **SA Stud Book's SADairybulls.com**, 2014**.** Open-source website where all national and international Holstein, Jersey and Ayrshire bulls' breeding values and indices can be observed on the South African scale. This includes conventional BLUP breeding values (EBVs for proven bulls in SA and MACE for international bulls), as well as genomically enhanced breeding values (GEBVs and GMACE). This development therefore enables direct genetic comparison of all international and South African dairy bulls, without any adaptations that needs to be done on the breeding values.
- **SA Stud Book's Biobank**, 2014**.** With regards to future inclusion of genomic information in SA Stud Book'Genetic Evaluations, a Biobank for the preservation and storage of DNA material, in the form of hair samples, of South Africa's national animals has been established and managed by SA Stud Book in Bloemfontein.
- **SA Stud Book's Genomically Enhanced Breeding Values**, 2014. In collaboration with the Canadian Dairy Network, SA Stud Book developed methodology to incorporate genomic information in Logix Milk Genetic Evaluations for the Holstein, Jersey and Ayrshire breeds. This entails :
  - Obtaining genomic profiles of SA Holstein, Jersey and Ayrshire animals, generated using the high density (GGP HD 78k) and or Low Density (GGP LD 23k) chips

- Estimation of DGVs on the Canadian scale, based on the North American Consortium's Reference Population
- Converting DGVs to the SA scale using Interbull Conversion Equations
- Blending converted DGVs with SA mid-parent EBVs - based on performance of cows in the SA environment – to produce Genomically Enhanced EBVs
- Multiplying reliabilities of the DGVs with genetic correlation coefficients between SA and Canada for the specific trait, thereby accounting for Genotype x Environmental interactions

6. Tswane University of Technology:

Piet Jooste:

Scientific Publications:

- NYANZI, R, JOOSTE, P J, CAMERON, M, WITTHUHN, R. C. (2013) Relevance of protein-encoding gene sequencing in identification and phylogenetic analysis of Lactobacillus isolates from probiotic food products and supplements. Food Biotechnology, 27:303–327.

- NYANZI, R., AWOUAFACK, M.D., STEENKAMP, P., JOOSTE, P. J. and ELOFF, J.N. (2014). Anti-candidal activity of cell extracts from 13 probiotic Lactobacillus strains and characterisation of lactic acid and a novel fatty acid derivative from one strain Food Chemistry. 164, 470–475.

- JOOSTE P.J., ANELICH L., AND MOTARJEMI Y. (2014) Safety of Food and Beverages: Milk and Dairy Products. In: Motarjemi Y. (ed.) Encyclopedia of Food Safety, Volume 3, pp. 285-296. Waltham, MA: Academic Press.

- BEKKER, L. STEYN, P. JOOSTE AND C. HUGO (2015) Comparison of the growth kinetics and proteolytic activities of Chryseobacterium species and Pseudomonas fluorescens. Submitted for publication in the Canadian J of Microbiology.

Linde Du Toit:

- C.J.L. du Toit, H.H. Meissner& W.A. van Niekerk, 2013. Direct methane and nitrous oxide emissions of South African dairy and beef cattle. S. Afr. J. Anim. Sci. 43, 320-339.

7. University of Free State:

Dept of Microbiology, Biochemical and Food Biotechnology:

Koos Myburgh:

Projects:

- The impact of heat on milk components, 2014.
- Fractionation and Characterisation of a Commercial Yeast Extract To Facilitate Acceleration of Yogurt Fermentation, 2014.
- rBST and flocculation and milk destabilisation, 2014.
- The optimisation of accelerated yogurt production, 2014.
- The evaluation of components present in commercial yeast extract which decreases yoghurt fermentation time, 2014.
- Milk Flocculation, 2015.

Conference Presentations:

- Smith A and Myburgh J.,2013. Acceleration of yogurt fermentation. SA Society of dairy technology - 45st Annual general meeting and symposium, Parys, April 23.
- Myburgh, J & Smith E-A., 2014. The Effect Of Heat Exposure On The B-Lactoglobulin In Milk Based in IDF: 178:2005 (E). Symposium SA Society of Dairy Technology, Cape Town, 22-23 April.
- Myburgh, J and Hattingh A., 2015. The effect of heat exposure on B-Lactoglobulin in raw milk. 48th SADT Annual meeting and Symposium. Cape St Francis Resort, Southern Cape, April 13-16.
- Smith A and Myburgh J., 2015. rBST in Milk. 48th SADT Annual meeting and Symposium. Cape St Francis Resort, Southern Cape, 13-16 April.
- Smith A and Myburgh J., 2015. Techniques develop to be used in Milk quality assessments.
- Post-Doctoral prestige day at UFS, Bloemfontein, 16 July. Techniques develop to be used in Milk quality assessments.

Scientific Publications

- Smith, E-A., Myburgh, J., Osthoff, G. & de Wit, M., 2014. Acceleration of yoghurt fermentation time by yeast extract and partial characterisation of the active components. J. Dairy Res. 81, 417-423.

Techniques developed or modified for the Dairy Industry:

- Analysis for milk adulteration through whey
- Analysis for ß-Lactoglobulin and the development of standards
- Analysis for ß-Lactoglobulin disappearance during heat treatment
- Analysis for addition of Annatto
- Analysis for starch in dairy products, e.g. yogurt
- Analysis for proteases for identification of bacterial protease

Department of Animal, Wildlife and Grassland Sciences:

Frikkie Neser:

Scientific Publications:

- F.W.C. Neser, J.B. van Wyk & V. Ducrocq, 2014. A preliminary investigation into genotype x environment interaction in South African Holstein cattle for reproduction and production traits. S. Afri. J. Anim. Sci., 44 (Issue 5, Suppl. 1), S75-S79.

Conference Presentations:

- A Cadet, C Patry, JB van Wyk, L Pienaar, V Ducrocq & FWC Neser, 2015. Comparison of two approaches to account for GXE interactions for production traits in South African Holstein cattle. SASAS Congress – Animal Science in Practice, Empangeni, 21-23 September.

- CADET, A., PATRY, C., VAN WYK, J.B., LAMOUREUX, S., PIENAAR, L., NESER, F.W.C. & DUCROCQ, V. 2015. Two approaches to account for GxE interactions for production traits in South African Holstein cattle. Interbull, Orlando, Florida

- CADET, A., PATRY, C., VAN WYK, J.B., LAMOUREUX, S., PIENAAR, L., NESER, F.W.C. & DUCROCQ, V. 2015. GxE interactions in South African Holstein cattle for reproduction and production traits. 6*4th Ann. Meeting Europ. Assoc. Anim. Prod.*, 31 August – 4 September, Warsaw, Poland

- CADET, A., PATRY, C., VAN WYK, J.B., PIENAAR, L., NESER, F.W.C. & DUCROCQ, V. 2015. Comparison of two approaches to account for GxE interactions for production traits in South African Holstein cattle. SASAS, 21-23 September, Zululand

- FAIR, M.D., NESER, F.W.C. & VAN WYK, J.B., 2014. Analyses of calving interval in SA Holstein cows using random regression models. *63rd Ann. Meeting Europ. Assoc. Anim. Prod.*, 25 - 29 August, Copenhagen, Denmark

8. UNIVERSITY OF KWA-ZULU NATAL:
Discipline of Plant Pathology:

Mark Laing:

Projects:

- The biological control of Staphylococcus aureus-induced bovine mastitis using bacteriophage and bacteriocin therapy
- The development of improved protocols for the accurate and rapid detection of mastitis in milk
- Integrated control of liver flukes in livestock using botanical extracts plus bio-control agents

Scientific Publications:

- I.H. BASDEW AND M.D. LAING, 2015. Investigation of the lytic ability of South African bacteriophages specific for Staphylococcus aureus, associated with bovine mastitis. Biocontrol Science and Technology, 25:4, 429-443, DOI: 10.1080/09583157.2014.983458
- I. H. BASDEW AND M. D. LAING, 2014. Stress sensitivity assays of bacteriophages associated with Staphylococcus aureus, causal organism of bovine mastitis. Afr. J. Microb. Res. 8, 200-210.
- I. H. BASDEW, M.D. LAING, P.H. MAPHAM AND J.H.VORSTER, 2013. The biological control of bovine mastitis using bacteriophage therapy. CPD article: AC/0993/13.

Discipline of Animal Science:
Michael Chimonyo

- N.W. SITHOLE, I.V. NSAHLAI AND M. CHIMONYO, 2015. Water and Wastewater Management in the Dairy Industry. Natsurv 4 WRC, Pretoria.

9. University of Pretoria Main Campus:

Elna Buys:

Project:

- Characterization of coliform bacteria and *Escherichia coli* from fresh milk to determine the prevalence of possible pathogenic types.

Conference Presentations;

- D. T. Mugadza and E. M. Buys, 2014. Diversity of Spore formers and Non – sporeformers in Extended Shelf Life Milk. Proc. of the SASDT Conference 2014, Cape Town.
- S. Khoza and E.M. Buys, 2014. Attachment and biofilm formation by B. Cereus and M. luteuson stainless steel strips. Proc. of the SASDT Conference 2014, Cape Town.
- Aijuka, M. & Buys, E.M., 2014. Characterization of E. coli from South African environmental sources. Proc. of the SASDT Conference 2014, Cape Town.
- Ntuli, V., Njage, P. & Buys, E.M., 2014. Antibiotic resistance patterns of identified E. coli serotypes in bulk milk. Proc. of the SASDT Conference 2014, Cape Town.

Lourens Erasmus:

Scientific Publications:

- Sakkers , M., L. J. Erasmus, P. Robinson, R. Meeske, and J. Garrett, 2013. Determining *in vivo* ruminal stability of three ruminally protected nutrients in lactating Jersey cows. Animal Feed Science and Technology. 185, 133-139.
- Raffrenato, E. and L. J. Erasmus, 2013. Variability of indigestible NDF in C_3 and C_4 forages and implication on the resulting feed energy values and potential microbial protein synthesis in dairy cattle. South African Journal of Animal Science 43, S93-S97.
- Erasmus, L. J. and E. C Webb, 2013. The effect of production system and management practices on the environmental impact, quality and safety of milk and dairy products. S. Afr. J. Anim. Sci. 43,424-434.
- Webb, E. C., and L. J Erasmus, 2013. The effect of production system and management practices on the quality of meat producs from ruminant livestock. South African Journal of Animal Science. 43, 415-420.
- Erasmus, L. J., Z. Bester and R. J. Coertze, 2013. Milk composition as technique to evaluate the relative bioavailability of a liquid rumen protected methionine source.S Afr. J. Anim. Sci 43, S86-S92.
- Swanepoel, N., P. Robinson, and L. J. Erasmus, 2014. Determining the optimal ratio of canola meal and high protein dried distillers grain protein in diets of high producing Holstein dairy cows. Anim Feed Sci. Technol, 189, 41-53.

- Van Wyngaard, J. D. V., R Meeske, and L. J. Erasmus, 2015. Effect of palm kernel expeller as supplementation on production performance of Jersey cows grazing kikuyu ryegrass pasture. Anim Feed Sci. and Technol. 199, 29-40.

- Muya M. C., F. V. Nherera, K. A. Miller, C. C. Aperce, P. M. Moshidi and L. J. Erasmus. 2015. Effect of Megasphaera elsdenii NCIMB 41125 dosing on rumen development, volatile fatty acid production and blood b-hydroxybutyrate in neonatal dairy calves. Journal of Animal Physiology and Animal Nutrition. DOI: 10.1111/jpn.12306.

- Swanepoel, N., P. H. Robinson and L. J. Erasmus, 2015. Effects of ruminally protected methionine and/or phenylalanine on performance of high producing Holstein cows fed rations with very high levels of canola meal. Animal Feed Science and Technology 205, 10-22

Conference Presentations

- Van Wyngaard, J.D.V., Meeske, R. & Erasmus, L.J., 2013. Effect of palm kernel expeller as supplement on rumen parameters of dairy cows grazing kikuyu/ryegrass pasture. Poster presented at SASAS Conference, Bloemfontein.
- Swanepoel, N.S., Robinson, P.H. & Erasmus, L.J., 2013. Canola meal and corn dried distillers' grains in diets of high producing Holstein cows: What is the optimal ratio? Poster presented at SASAS Conference, Bloemfontein.
- Raffrenato, E., Antis, A., Barber, D., Poppi, D.P., Callow, M. & Erasmus, L.J., 2013. Estimation of a fast and slow starch digesting pool in cereals. Poster presented at SASAS Conference, Bloemfontein.
- Muya, M.C. & Erasmus, L.J., 2013. Performance of High Milk Fed Pre-weaned Holstein Calves dosed with *Megasphaer aelsdenii* NCIMB 41125. Poster presented at SASAS Conference, Bloemfontein.
- Meiring, A.P., Erasmus, L.J. & Meeske, R., 2013. An investigation into the effects of different feed additives on fermentation and performance parameters of jersey cows fed total mixed rations. Poster presented at SASAS Conference, Bloemfontein.
- Raffretato, E., McNeill, D.M., Barber, D., Callow, M., Poppi, D.P. & Erasmus, L.M., 2013. Estimation of indigestible NDF in forages from cell wall composition. Poster presented at SASAS Conference, Bloemfontein.
- Hagg, F.M., Erasmus, L.J., Van der Veen, R.H., Haasbroek, E., Taylor, S. & Oguey, C., 2013. Phytonutrients or calcified marine algae as natural alternatives to monensin in beef feedlot diets. Short communication presented at ADSA and ASAS Joint Meeting, Indianapolis, IN.
- Erasmus, L.J., Meiring, A.P., Meeske, R. & Venter, R., 2014. Effect of essential oils, monensin and live yeast supplements on rumen fermentation in Jersey cows. Poster presented at EAAP Annual Meeting, Copenhagen, Denmark.
- Muya, M.C., Nherera, F.V., Miller, K.A., Aperce, C.C., Moshidi, P.M. & Erasmus, L.J., 2014. Rumen development, volatile fatty acid and blood β-hydroxybutyrate in neonatal dairy calves dosed with *Megashpaera elsdenii* NCIMB 41125. Poster presented at Proc. Am. Soc. Of Animal Science, Mid-Western Section.

- Swanepoel, N.S., Erasmus, L.J. & Robinson, P.H., 2014. Effects of supplementing early lactation dairy rations containing high levels of canola meal with ruminally protected Phe and/or Met. Poster presented at JAM of the American Dairy Science and Animal Science, Kansas City, Kansas.
- Swanepoel, N., Robinson, P.H. and Erasmus, L.J 2015. Rumen microbial protein outflow and plasma amino acid levels in early lactation multiparity Holstein cows in commercial California diary herds. Poster presented at the JAM of American Dairy and Animal Science Societies, Orlando, FL.
- Erasmus, L.J., B. Medina, P. Meiring and B. Ghilardi, 2015. Evaluation of botanical extracts or not with live yeast compared to monensin supplementation on rumen fermentation in lactating cows. Poster presented a ADSA JAM, Orlando, FL.
- Henning, P.H. and L.J. Erasmus, 2015. Global dairy : African perspective. Invited paper, American Dairy Science Assoc. JAM, Orlando, FL.

Projects:

- Effect of yeast based direct fed microbial supplementation on the performance of high producing dairy cows.
- Effect of essential oils and live yeast supplementation on rumen fermentation dynamics in Jersey cows.
- Association between grinding energy and *in vitro* neutral detergent fibre digestion kinetics in forages.
- Estimation of indigestible NDF in forages from cell wall components.
- Ruminal colonization and potential of Megasphaera elsdenii NCIMB 41125 to stimulate rumen development and its effect on the performance of neonatal dairy calves.
- Ruminally protected amino acid supplementation as a nutritional strategy improves performance of dairy cows fed high levels of canola meal.
- Quantification and mitigation of enteric methane emissions from Jersey cows grazing ryegrass pastures – contributing to the greenhouse gas inventory of South Africa.

Hettie Schönfeldt:

Conference Presentations:

- Z du plooy, HC Schönfeldt, N Hall & H Vermeulen, 2013. Change in health claims in dairy products between 2009 and 2012 in South Africa (IFDC 10th International Food Data Congress, Granada, Spain).
- Z du plooy, HC Schönfeldt, N Hall & H Vermeulen, 2013.The impact of changing labelling legislation on health claims on dairy products between 2009 and 2012 (IUNS 20th International Congress of Nutrition, Granada, Spain).

- Z du plooy, HC Schönfeldt & N Hall, 2013. A perspective on Health Benefit Claims as related to dairy products (20th SAAFoST Biennial International Congress and Exhibition, Pretoria, South Africa).
- Z du plooy, HC Schönfeldt & N Hall, 2014.Traditional foods in the food-based-dietary guideline (Nutrition Congress of the Nutrition Society of South Africa, Johannesburg).

Esté van Marle-Köster:

Scientific Publications:

- E. van Marle-Köster, C. Visser & D.P. Berry, 2013. A review of genomic selection – Implications for the South African beef and dairy cattle industries. S. Afr. J. Anim. Sci. 43, 1-17.
- Bosman. L, Van Marle-Köster, E & Visser, C. 2015. Genetic diversity of South African dairy goats for genetic management and improvement. Small Ruminant Research 123, 224-231.

Conference Presentations:

- Bosman, L., Grobler, R., Van Marle-Köster, E. & Visser, C., 2013. Current status of the commercial dairy goat industry in South Africa. South Africa. 46th South African Society for Animal Science (SASAS) Congress, Bloemfontein June 2013
- Grobler, R., Lashmar, S.F., Visser, C. & Van Marle-Köster, E., 2014. Polymorphism of casein genes in South African dairy goats using the 50k Illumina Caprine chip. 47th South African Society for Animal Science (SASAS) Congress. Pretoria. 6-8 July 2014.

10. University of Pretoria Onderstepoort Campus:

Geoffrey Fosgate:

Conference Presentations:

- Fosgate, G. T., Petzer, I-M. & Karzis, J., 2013. Sensitivity and specificity of a hand-held milk electrical conductivity meter compared to the California mastitis test for mastitis in dairy cattle. URI: http://hdl.handle.net/2263/31046.

- B Motimele, P Irons & G Fosgate, 2015. The accuracy of pregnancy-associated glycoproteins ELISA tests for early pregnancy diagnosis in South African dairy herds. Proceedings of the SASAS Congress, Empangeni, 21-23 September 2015.

Inge-Marie Petzer:

Scientific Publications:

- Petzer, I-M., Karzis, J., Meyer, I.A. & van der Schans, T.J., 2013. A cost benefit model comparing the California Milk Cell Test and Milk Electricl resistance Test. Onderstepoort J. Vet. Res. 80 (1), 6 pages.
- Petzer, I-M., Karzis, J., Lesosky, M., Watermeyer, J. C & Badenhorst, R., 2013. Host adapted intramammary infections in pregnant heifers which were co-housed and reared on fresh milk as calves. URI: http://hdl.handle.net/2263/21518.

Martin van der Leek:

Project:

- Resistance to available antibiotics in lactating cows with mastitis.

Conference Presentations:

- Van der Leek, M., 2014. Beyond traditional dairy veterinary services: 'It's not just about the cows!' Presented at the LHPG, 2014 congress, Skukuza.
- Van der Leek, M., 2015.'GOOD THINGS GONE BAD: The Unintended Consequences of Dairy Consulting in TMR Herds.'Presented at the RuVASA (formerly LHPG) 2015 congress, Rawsonville.

Jan van Wyk:

Project:

- Impact on Dairy Production and Sustainable management on Selected Farms in South Africa.

11. University of Stellenbosch:

Chrisjan Cruywagen:

Projects:

- The effect of processing and vitreousness of maize on starch digestibility in dairy cows.
- The effects of supplementing alternative carbohydrate sources on production and fibre degradation of Jersey cows grazing pasture.
- Selenium supplementation to dairy goats and the effect of selenium content on goat's milk and cheese.
- Buffer supplementation in concentrates for Jersey cows on spring ryegrass pasture.
- High fibre concentrates for dairy cows on pasture.
- The effect of different energy and nitrogen sources on *in vitro* fibre digestion of high and low quality roughages.
- The effect of maize, citrus pulp or molasses as energy sources and soybean meal and urea as nitrogen sources on *in vitro NDF dig*estion of high and low quality forages.
- The effect of oregano essential oil on milk production responses of pasture based Jersey cows.
- The effect of oregano essential oil on milk production responses of Holstein cows in a zero-grazing system.
- The effect of fenugreek cotyledon concentrates on milk production responses of Holstein cows.

Scientific Publications:

- Van de Vyver, W.F.J. & Cruywagen, C.W., 2013. Exogenous fibrolytic enzymes to unlock nutrients: a histological investigation of its effects on fibre degradation in ruminants. S. Afr. J. Anim. Sci. 43, 54-59.
- Steyn, L., Meeske, R. & Cruywagen, C.W., 2014. Substitution of ryegrass pasture with a high fibre concentrate supplement to grazing Jersey cows to overcome winter roughage shortages. Anim. Feed Sci. Technol. 188, 36-45.
- Useni, B.A. Muller, C.J.C. & Cruywagen, C.W., 2014. Milk production of dairy cows as affected by the length of the preceding dry period. S. Afr. J. Anim. Sci. 44 (Supplement 1), 21-24.
- Cruywagen, C.W., Taylor, S., Beya, M.M. & Calitz, T., 2015. The effect of buffering dairy cow diets with limestone, calcareous marine algae, or sodium bicarbonate on ruminal pH profiles, production responses, and rumen fermentation. J. Dairy Sci. 98, 5506-5514.
- Cruywagen, C.W. & Calitz, T., 2015. *In vitro* degradation of melamine by ruminal microorganisms. S. Afr. J. Anim. Sci. 45, 137-142.

Chapter in book:

- Bertuzzi, T., Gallo, A., Moschini, M., Cruywagen, C.W. & Masoero, F., 2013. Transfer of melamine to cheese. Ch 51 in: Handbook of Cheese in Health: Production, Nutrition and Medical Sciences. Ed: V.R. Preedy and V.B. Patel. Wageningen Academic Publishers. Wageningen.

12. Western Cape Elsenburg:

Carl Muller:

Projects:

- The effect of sire selection for body size or milk yield on the live weight, stature, body size, milk yield performance, feed efficiency, reproduction performance and longevity in Holstein cows.
- The effect of energy source on the milk yield and reproduction performance of Holstein cows.
- A comparison of the milk fatty acid composition and conjugated linoleic acid (CLA) content of Holstein, Fleckvieh x Holstein, Jersey and Fleckvieh x Jersey cows in an intensive and pasture based feeding system.
- The chemical composition, in vitro fermentation, methane and milk production potential in dairy cows of cereal crops and cereal-legume crop combinations in a Mediterranean region

- Estimation of genetic parameters for live weight and the correlation with body size traits, milk yield and productive life for Jersey cows
- Evaluation of carob pod meal as alternative energy source for dairy cattle.
- A comparison of the beef production of Holstein and Fleckvieh x Holstein crossbred bull calves reared intensively and on pasture
- A comparison of the milk yield of Holstein and Fleckvieh x Holstein crossbred cows in an intensive feeding system.

Scientific Publications:

- C.J.C. Muller, J.P. Potgieter, S.W.P. Cloete & K. Dzama, 2014. Non-genetic factors affecting fertility traits in South African Holstein cows, S. Afr. J. Anim. Sci. 44, 54-63.
- C.J.C. Muller, J.A. Botha, F. Calitz & M. Lehmann, 2014. Effect on feed intake, milk production and milk composition of Holstein cows by replacing maize grain with wheat in total mixed rations. S. Afr. J. Anim. Sci. 44, 271-279.
- Muller, C.J.C., Sasanti, B., Abel, S. & Schmulian, A., 2013. The milk fatty acid composition and conjugated linoleic acid content of Jersey and Fleckvieh x Jersey cow milk in a pasture-based feeding system. *Proc. 20th Conf. Assoc. Advmt. Anim. Breed. Genet*. 21-23 October 2013. Napier, New Zealand. p. 435-438.
- Muller, C.J.C., Potgieter, J.P., Cloete, S.W.P. & Botha, J.A., 2013. Reproductive performance of Holstein and Fleckvieh x Holstein heifers and cows in a total mixed ration feeding system. *Proc. 20th Conf. Assoc. Advmt. Anim. Breed. Genet*. 21-23 October 2013. Napier, New Zealand. p. 439-442.
- Muller, C.J.C., Goni, S., Dzama, K. & Botha, J.A., 2013. The beef production of a Jersey herd as affected by crossbreeding using Fleckvieh sires. *Proc. 20th Conf. Assoc. Advmt. Anim. Breed. Genet*. 21-23 October 2013. Napier, New Zealand. p. 443-446.
- Useni, B.A., Muller, C.J.C. & Cruywagen, C.W., 2014. Milk production of dairy cows as affected by the length of the preceding dry period. *S. Afr. J. Anim. Sci.* 44 (5, Supplement 1), S21-S24.
- Muller, C.J.C., Potgieter, J.P. & Cloete, S.W.P., 2014. The fertility of South African Holstein and Jersey heifers. *Proc. 10th Wo. Con. Gen. Appl. Livest. Prod.* August 17-22, 2014. Vancouver, BC, Canada. Poster AB640.
- Goni, S., Muller, C.J.C., Dube, B. & Dzama, K., 2014. Milk production of Jersey and Fleckvieh x Jersey cows in a pasture-based feeding system. *Trop. Anim. Health Prod*. 46 (7), DOI 10.1007/s11250-014-0698-y.
- Goni, S., Muller, C.J.C., Dube, B & Dzama, K., 2015. Reproductive performance of Jersey and Fleckvieh x Jersey heifers and cows maintained in a pasture-based feeding system. *S. Afr. J. Anim. Sci.* 45 (4), 379-385.
- Muller, C.J.C., Potgieter, J.P., Cloete, S.W.P. & Botha, J.A., 2015. Reproductive performance of Holstein and Jersey heifers and cows in a pasture-based system in South Africa. *Proc. 21st Conf. Assoc. Advmt. Anim. Breed. Genet*. 28-30 September 2015. Lorne Victoria, Australia. p. 443-446.
- Abel, S., Muller, C.J.C. & Sasanti, B., 2015. Methane emmissions estimated based on milk fatty acids of Jersey and Fleckvieh x Jersey cows in a pasture-based system. *Proc. 21st Conf. Assoc. Advmt. Anim. Breed. Genet*. 28-30 September 2015. Lorne Victoria, Australia. p. 443-446.
- Sasanti, B., Abel, S., Muller, C.J.C., Gelderblom, W.C.A. & Schmulian, A., 2015. Milk fatty acid composition and conjugated linoleic acid content of Jersey and Fleckvieh x Jersey cow milk in a pasture-based feeding system. *S. Afr. J. Anim. Sci.* 45 (4), 411-417.

Conference Presentations:

- B. Sasanti, C.J.C. Muller, S. Abel & A. Schmulian, 2013. The fatty acid content of the milk fat of Holstein and Fleckvieh x Holstein cows on a total mixed ration. Proceedings of the 46th SASAS Congress.
- B.A. Useni, C.J.C. Muller & C.W. Cruywagen, 2013. The effect of early post calving health problems on the milk yield of Holstein dairy cows. Proceedings of the 46th SASAS Congress.
- B.A. Useni, C.J.C. Muller & C.W. Cruywagen, 2013. Milk production of dairy cows as affected by the length of the preceding dry period. Proceedings of the 46th SASAS Congress.
- B.A. Useni, C.J.C. Muller & C.W. Cruywagen, 2013. The effect of live weight and age on the pregnancy rate of Holstein and Jersey heifers. Proceedings of the 46th SASAS Congress.
- M Burger, CJC Muller & JA Botha, 2015. Factors affecting the occurrence of laminitis in dairy cows: A review. Proceedings of the 48th SASAS Congress, Empangeni, 21-23 September.
- CJC Muller, JP Potgieter, SWP Cloete & JA Botha, 2015. Reproductive performance of Holstein and Jersey heifers and cows in a pasture-based system. Proceedings of the 48th SASAS Congress, Empangeni, 21-23 September.
- BA Useni, CJC Muller & CW Cruywagen, 2015. Effect of energy sources on energy partition and milk production of dairy cows. Proceedings of the 48th SASAS Congress, Empangeni, 21-23 September.
- De Waal, H.L., Muller, C.J.C. & Kleynhans, T.E., 2013. Dairy herd growth as affected by calving rate of cows, heifer and cow survival and bull to heifer ratio. 46th *SASAS Congress*, 24-26 June 2013. University of the Free State, Bloemfontein. p. 137.
- Goni, S., Dzama, K., Muller, C.J.C. & Botha, J.A., 2013. The milk production and milk composition of Jersey and Fleckvieh x Jersey cows in a pasture-based system. 46th *SASAS Congress*, 24-26 June 2013. University of the Free State, Bloemfontein. p. 72.
- Metaxas, L., Muller, C.J.C., Dzama, K. & Botha, J.A., 2013. The beef production of Holstein and Fleckvieh x Holstein calves as veal or steers. 46th *SASAS Congress*, 24-26 June 2013. University of the Free State, Bloemfontein. p. 175.
- Muller, C.J.C., Burger, W.J. & Lamont, M.M.C., 2013. The live weight of replacement dairy heifers on commercial dairy farms in comparison to breed guidelines. 46th *SASAS Congress*, 24-26 June 2013. University of the Free State, Bloemfontein. p. 193.
- Useni, B.A., Muller, C.J.C. & Cruywagen, C.W., 2013. Milk production of dairy cows as affected by the length of the preceding dry period. 46th *SASAS Congress*, 24-26 June 2013. University of the Free State, Bloemfontein. p. 31.
- Mnisi, M.N., Muller, C.J.C. & Botha, J.A., 2013. The effect of breed and season on milk yield and udder health in a closed dairy herd. *31st SASAT Annual Congress*, 17-20 September 2013. Kedar Country Lodge, Rustenburg. North-West Province.
- Muller, C.J.C., Potgieter, J.P. & Cloete, S.W.P., 2013. Reproduction management in dairy herds – indicators and fertility parameters. Small and Large Animal Congress of the Western Cape Branch of South African Veterinary Association. 4-5 October 2013. Cape Town. p. 89.
- Muller, C.J.C., Sasanti, B., Abel, S. & Schmulian, A., 2013. The milk fatty acid composition and conjugated linoleic acid content of Jersey and Fleckvieh x Jersey cow milk in a pasture-based feeding system. *Proc. 20th Conf. Assoc. Advmt. Anim. Breed. Genet*. 21-23 October 2013. Napier, New Zealand. p. 435-438.
- Muller, C.J.C., Potgieter, J.P., Cloete, S.W.P. & Botha, J.A., 2013. Reproductive performance of Holstein and Fleckvieh x Holstein heifers and cows in a total mixed ration feeding system.

Proc. 20th Conf. Assoc. Advmt. Anim. Breed. Genet. 21-23 October 2013. Napier, New Zealand. p. 439-442.

- Muller, C.J.C., Goni, S., Dzama, K. & Botha, J.A., 2013. The beef production of a Jersey herd as affected by crossbreeding using Fleckvieh sires. *Proc. 20th Conf. Assoc. Advmt. Anim. Breed. Genet*. 21-23 October 2013. Napier, New Zealand. p. 443-446.
- Muller, C.J.C. & Scholtz, M.M., 2014. Ways to reduce the environmental impact of dairy farming. 48th Annual Conference of the South African Society for Agricultural Extension. 9-13 June 2014, George.
- Muller, C.J.C. & Botha, J.A., 2014. The fertility of Holstein and Jersey heifers in commercial dairy herds. 47th *SASAS Congress*, 6-8 July 2014. University of Pretoria, Pretoria. 2.1 Animal Breeding. p. 72.
- Useni, B.A., Muller, C.J.C. & Cruywagen, C.W., 2014. Effect of energy source on milk production and reproduction of primi-parous Holstein dairy cows. 47th *SASAS Congress*, 6-8 July 2014. University of Pretoria, Pretoria. 2.7 Ruminant Nutrition. p. 72.
- Goni, S., Muller, C.J.C. & Dzama, K., 2014. Reproductive performance of Jersey and Fleckvieh x Jersey cows in a pasture-based system. 47th *SASAS Congress*, 6-8 July 2014. University of Pretoria, Pretoria. 3.1 Animal Breeding. p. 72.
- Muller, C.J.C. & Botha, J.A., 2014. Comparison of the body size of Jersey and Fleckvieh x Jersey heifers in a pasture-based feeding system. 47th *SASAS Congress*, 6-8 July 2014. University of Pretoria, Pretoria. 3.1 Animal Breeding. p. 74.
- Metaxas, L., Muller, C.J.C., Dzama, K. & Botha, J.A., 2014. The milk production performance of Holstein and Fleckvieh x Holstein cows in a total mixed ration feeding system. 47th *SASAS Congress*, 6-8 July 2014. University of Pretoria, Pretoria. 3.2 Production Management. p. 78.
- Useni, B.A., Muller, C.J.C. & Cruywagen, C.W., 2014. Effect of feeding management during transition on energy balance and early lactation of dairy cows. 47th *SASAS Congress*, 6-8 July 2014. University of Pretoria, Pretoria. 3.2 Production Management. p. 72.
- De Waal, H.L., Muller, C.J.C. & Van der Rijst, M., 2014. Non-genetic factors affecting the lifetime performance of South African Holstein cows. 47th *SASAS Congress*, 6-8 July 2014. University of Pretoria, Pretoria. 3.2 Production Management. p. 72.
- Muller, C.J.C., Potgieter, J.P. & Cloete, S.W.P., 2014. The fertility of South African Holstein and Jersey heifers. *Proc. 10th Wo. Con. Gen. Appl. Livest. Prod.* August 17-22, 2014. Vancouver, BC, Canada. Poster AB640.
- Mnisi, M.N., Muller, C.J.C. & Lombard, D., 2014. Lessons learned regarding small-scale dairy farming in Kenya. *32nd SASAT Annual Congress*, 2-3 September 2014. Arniston Spa Hotel, Waenshuiskrans. West Cape Province.
- Botha, J.A. & Muller, C.J.C., 2014. Comparison of body size in Holstein and Fleckvieh x Holstein heifers. *32nd SASAT Annual Congress*, 2-3 September 2014. Arniston Spa Hotel, Waenshuiskrans. West Cape Province.
- Abel, S., Sasanti, B., Arendse, L., Muller, C.J.C., de Kock, M. & Gelderblom, W.C.A., 2014. Conjugated linoleic acid isomers as anticancer bioactive compounds. *Research Day 2014*. A celebration of research excellence at CPUT. 27 November 2014. Mowbray Campus. Cape Town. p. 85.
- Muller, C.J.C., Potgieter, J.P., Cloete, S.W.P. & Botha, J.A., 2015. Reproductive performance of Holstein and Jersey heifers and cows in a pasture-based system in South Africa. *Proc. 21st*

Conf. Assoc. Advmt. Anim. Breed. Genet. 28-30 September 2015. Lorne Victoria, Australia. p. 443-446.

- Abel, S., Muller, C.J.C. & Sasanti, B., 2015. Methane emmissions estimated based on milk fatty acids of Jersey and Fleckvieh x Jersey cows in a pasture-based system. *Proc. 21st Conf. Assoc. Advmt. Anim. Breed. Genet*. 28-30 September 2015. Lorne Victoria, Australia. p. 443-446.

13. Western Cape Outeniqua:

Robin Meeske:

Projects:

- Evaluation of intensive and extensive beef cross calf rearing systems using Jersey X Angus cows on pasture.
- Effect of rumen specific live yeast supplementation on rumen fermentation characteristics and in situ NDF degradation of 4 forages differing in quality.
- Using citrus pulp as an alternative energy supplement to maize grain for lactating cows grazing in ryegrass pasture.
- Essential oils as feed additive for lactating cows grazing ryegrass pasture.
- Measuring enteric methane emissions from lactating Jersey cows in a pasture-based system.

Scientific Publications:

- M. van Zyl, R. Meeske, G.D.J. Scholtz & O.B. Einkamerer, 2014. The effect of lucerne (Medicago sativa) hay quality on milk production and composition of Jersey cows. S. Afr. J. Anim. Sci. 44 (Suppl. 1), 25-30.

- M. van Zyl, G.D.J. Scholtz1, H.J. van der Merwe & R. Meeske, 2014. The influence of the inside diameter of the coring probe on the chemical composition of lucerne hay samples. S. Afr. J. Anim. Sci. 44 (Suppl. 1), S41-S43.

Conference Presentations:

- Z Moller, R Meeske & CW Cruywagen, 2015. The use of Oregano as feed-additive for dairy cows grazing on ryegrass pasture in spring. Proceedings of the 48th SASAS Congress, Empangeni, 21-23 September.

- JDV van Wyngaard, R Meeske & LJ Erasmus, 2015. Sulphur hexa-flouride tracer gas technique for estimating methane emissions from grazing Jersey cows. Proceedings of the 48th SASAS Congress, Empangeni, 21-23 September.

- R Meeske & OB Einkamerer, 2015. The composition, compaction and aerobic stability of maize silage in South Africa. Proceedings of the 48th SASAS Congress, Empangeni, 21-23 September.

Anke van der Colf/Pieter Swanepoel (now US):

Projects:

- The evaluation of different planting methods to over-sow kikuyu with grass-clover mixtures into a kikuyu pasture.

- The production potential of sub-tropical and temperate grasses under rainfed conditions and grazing in the Southern Cape.

- Impact of subtropical grasses on soil organic matter sequestration and stratification.

- Monitoring fertilization and pasture production on Outeniqua Research Farm.
- Optimising nitrogen fertilization of kikuyu-based pastures over-sown with temperate grasses or legumes.

Scientific Publications:

- P.A. Swanepoel, P.R. Botha, C.C. du Preez & H.A. Snyman, 2013. Physical quality of a podzolic soil following 19 years of irrigated minimum-till kikuyu-ryegrass pasture. Soil & Tillage Research 133, 10–15.
- P. A. Swanepoel, J. Habig, C. C. du Preez, P. R. Botha & H. A. Snyman, 2014. Biological quality of a podzolic soil after 19 years of irrigated minimum-till kikuyu–ryegrass pasture. Soil Research 52, 64–75.

- P A Swanepoel, P RBotha, H A Snyman & C C du Preez, 2014. Impact of cultivation method on productivity and botanical composition of a kikuyu–ryegrass pasture. African Journal of Range & Forage Science, 31:3, 215-220, DOI: 10.2989/10220119.2014.903999.

- P.A. Swanepoel, C.C. du Preez, P.R. Botha, H.A. Snyman & J. Habig, 2014. Soil quality characteristics of kikuyu–ryegrass pastures in South Africa. Geoderma 232–234 (2014) 589–599.

- P A Swanepoel, C C du Preez, P R Botha & H A Snyman, 2015. A critical view on the soil fertility status of minimum-till kikuyu–ryegrass pastures in South Africa. African Journal of Range & Forage Science, 32(2): 113–124.

- P A Swanepoel, P R Botha, C C du Preez, H A Snyman & J Labuschagne, 2015. Managing cultivated pastures for improving soil quality in South Africa: challenges and opportunities. African Journal of Range & Forage Science 32(1): 1–6.

- J. van der Colf, P.R. Botha, R. Meeske & W.F. Truter, 2015. Seasonal dry matter production, botanical composition and forage quality of kikuyu over-sown with annual or perennial ryegrass. African Journal or Range & Forage Science 32(2): 133-142.

- J. van der Colf, P.R. Botha, R. Meeske & W.F. Truter, 2015. Grazing capacity, milk production and milk composition of kikuyu over-sown with annual or perennial ryegrass. African Journal of Range & Forage Science 32(2): 143-151.

- P.R. Botha, L.B. Zulu, J. van der Colf & P.A. Swanepoel, 2015. Production potential of Italian and Westerwolds ryegrass established at different planting dates. African Journal of Range & Forage Science 32(2): 153-159.