

OIE Collaborating Centres Reports Activities

Activities in 2021

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| Title of collaborating centre: | Surveillance and Control of Animal Diseases in Africa |
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| Name of Director of Institute (Responsible Official): | Dr. M Mulumba |
| Name (including Title and Position) of Head of the Collaborating Centre (formally OIE Contact Point): | Dr. M Mulumba Senior Manager Research: Animal Health and Protection |
| Name of writer: | Ms. Delille Wessels |

ToR: To provide services to the OIE, in particular within the region, in the designated specialty, in support of the implementation of OIE policies and, where required, seek for collaboration with OIE Reference Laboratories

ToR: To identify and maintain existing expertise, in particular within its region

1. Activities as a centre of research, expertise, standardisation and dissemination of techniques within the remit of the mandate given by the OIE

| Epidemiology, surveillance, risk assessment, modelling | |
|---|--|
| Title of activity | Scope |
| Rabies | Rabies data from domestic and wildlife from host species from specific provinces in South Africa |
| African Swine Fever | Epizootiological data were collected on the ASFV outbreak in South Africa from 2020. Activities included serological surveillance and phylogenetic characterisation of virus strains. Epizootiological data was also collected on the geographical expansion of the ASFV sylvatic cycle in South Africa. |
| Training, capacity building | |
| Title of activity | Scope |
| Rabies diagnostics | Virtual training to Ethiopia National Veterinary Laboratory |
| ASF, FMD, PPR | Hands-on training: Laboratory techniques used for the diagnosis of ASF, FMD, and PPR |
| Biosafety and Biosecurity | Hands-on training:: Laboratory Biosecurity and Biosafety |
| Risk analysis | Import risk analysis for African swine fever |
| Diagnosis, biotechnology and laboratory | |
| Title of activity | Scope |
| Rabies diagnostics | Immunoperoxidase test=9; Direct Fluorescent antibody testing = 372; FAT = 4524; PCR = 71 |
| Foot and Mouth disease | ELISA (SPCE) =90427; NSP ELISA = 5943; VN = 1150; PCR = 432 Virus isolation = 4 |
| African Swine Fever | ELISA = 3023; PCR = 460; Virus isolation = 7; Molecular typing= 92 |

ToR : To propose or develop methods and procedures that facilitate harmonisation of international standards and guidelines applicable to the designated specialty

2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the surveillance and control of animal diseases, food safety or animal welfare

| Proposal title | Scope/Content | Applicable area |
|---|--|--|
| Validation of lateral flow devices of the diagnosis of ASF | Validation of commercial lateral flow devices of the diagnosis of ASF | <input checked="" type="checkbox"/> Surveillance and control of animal diseases <input type="checkbox"/> Food safety <input type="checkbox"/> Animal welfare |
| Unraveling the Effect of Contact Networks & Socio-Economic Factors in the Emergence of Infectious Diseases at the Wild-Domestic Interface | Comprehensively assess the pig contact networks, pig management and socioeconomic factors, tick involvement in ASFV transmission, ASF seroprevalence and viral diversity in the sylvatic and domestic cycles | <input checked="" type="checkbox"/> Surveillance and control of animal diseases <input type="checkbox"/> Food safety <input type="checkbox"/> Animal welfare |
| Interrelationship of warthogs, Ornithodoros ticks and African swine fever in South Africa | Comprehensively assess the geographical expansion of the ASFV sylvatic cycle in South Africa | <input checked="" type="checkbox"/> Surveillance and control of animal diseases <input type="checkbox"/> Food safety <input type="checkbox"/> Animal welfare |

| | | |
|--|---|--|
| To determine the complete genome sequences of ASFV circulating in Africa | African swine fever virus (ASFV) genome sequencing to underpin control. Collaborative project involving the Agricultural Research Council (South Africa), the University of Pretoria (South Africa), the University of Victoria (Canada) and the International Livestock Research Institute (Kenya) | <input checked="" type="checkbox"/> Surveillance and control of animal diseases <input type="checkbox"/> Food safety <input type="checkbox"/> Animal welfare |
|--|---|--|

ToR: To establish and maintain a network with other OIE Collaborating Centres designated for the same specialty, and should the need arise, with Collaborating Centres in other disciplines

ToR: To carry out and/or coordinate scientific and technical studies in collaboration with other centres, laboratories or organisations

3. Did your Collaborating Centre maintain a network with other OIE Collaborating Centres (CC), Reference Laboratories (RL), or organisations designated for the same specialty, to coordinate scientific and technical studies?

No

4. Did your Collaborating Centre maintain a network with other OIE Collaborating Centres, Reference laboratories, or organisations in other disciplines, to coordinate scientific and technical studies?

Yes

| Name of OIE CC/RL/other organisation(s) | Location | Region of networking Centre | Purpose |
|---|------------------|---|--|
| Nigeria | Makurdi, Nigeria | <input checked="" type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East | To assess the neutralising antibodies against four lineages of LBVs in straw bats (Eidolon helvum) |

| | | | |
|---|--------------------------|--|--|
| Victoria Falls Wildlife Trust and Western University of Canada | Zimbabwe | <input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East | To determine the knowledge, attitude and Practices (KAP) Questionnaire and laboratory results assessing Rabies immunity from a sample of rural dogs |
| The Pirbright Institute | United Kingdom | <input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East | Validation of commercial lateral flow devices of the diagnosis of ASF |
| University of California, Davis CIRAD University of Maputo University of Pretoria | University of California | <input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East | Comprehensively assess the pig contact networks, pig management and socioeconomic factors, tick involvement in ASFV transmission, ASF seroprevalence and viral diversity in the sylvatic and domestic cycles |
| University of Pretoria, Kansas State University | United States of America | <input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East | Comprehensively assess the geographical expansion of the ASFV sylvatic cycle in South Africa |
| University of Pretoria University of Victoria International Livestock Research Institute | Kenya | <input checked="" type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East | To determine the complete genome sequences of ASFV circulating in Africa |

| | | | |
|---|--------|---|---|
| Reference Laboratory for African Swine Fever Virus, FGBI “Federal Centre for Animal Health, Russia. | Russia | <input type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East | To determine the complete genome sequences of ASFV circulating in Russia |
|---|--------|---|---|

ToR: To place expert consultants at the disposal of the OIE.

5. Did your Collaborating Centre place expert consultants at the disposal of the OIE?

No

ToR: To provide, within the designated specialty, scientific and technical training to personnel from OIE Member Countries

6. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by the OIE, to personnel from OIE Member Countries?

Yes

- a) Technical visits: 0
b) Seminars: 2
c) Hands-on training courses: 2
d) Internships (>1 month): 0

| Type of technical training provided (a, b, c or d) | Content | Country of origin of the expert(s) provided with training | No. participants from the corresponding country |
|--|---|---|---|
| b | Rabies diagnostics | Ethiopia | 5 |
| c | Laboratory techniques used for the diagnosis of ASF, FMD, and PPR | Malawi | 4 |
| c | Laboratory Biosecurity and Biosafety | South Africa | 25 |
| b | Import risk analysis for African swine fever | AU member states | 30 |

ToR: To organise and participate in scientific meetings and other activities on behalf of the OIE

7. Did your Collaborating Centre organise or participate in the organisation of scientific meetings on behalf of the OIE?

No

ToR: To collect, process, analyse, publish and disseminate data and information relevant to the designated speciality

8. Publication and dissemination of any information within the remit of the mandate given by the OIE that may be useful to Member Countries of the OIE

a) Articles published in peer-reviewed journals: 51

De Beer, C.J., Boikanyo, S.N.B., Venter, G.J. & Mans, B.J. 2021. The applicability of spectrophotometry for the assessment of blood meal volume in artificially fed *Culicoides imicola* in South Africa. *Medical and Veterinary Entomology* 35, 141-146. <https://doi.org/10.1111/mve.123473>

"Kelava, S., Mans, B.J., Shao, R., Moustafa, M.A.M., Matsuno, K., Takano, A., Kawabata, H., Sato, K., Fujita, H., Ze, C., Plantard, O., Hornok, S., Gao, S., Barker, D., Barker, S.C. & Nakao, R. 2021. Phylogenies from mitochondrial genomes of 120 species of ticks: Insights into the evolution of the families of ticks and of the genus *Amblyomma*. *Ticks and Tick-borne Diseases* 12: 101590. <https://doi.org/10.1016/j.ttbdis.2020.101577>"

"Mangena, M., Gcebe, N., Pierneef, R., Thompson, P.N. & Adesiyun, A.A. 2021. Q Fever: Seroprevalence, Risk Factors in Slaughter Livestock and Genotypes of *Coxiella burnetii* in South Africa. *Pathogens*, 10, 258. <https://doi.org/10.3390/pathogens10030258>

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Mbako, B.B., Featherston, J., Sibeko-Matjila, K.P. & Mans, B.J. 2021. Whole genome sequencing of *Theileria parva* using target capture. *Genomics* 113, 429-438. <https://doi.org/10.1016/j.ygeno.2020.12.033>

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Pilgrim, J., Siozios S., Baylis, M., Venter, G., Garros, C. & Hurst, G.D. 2021. *Cardinium* symbiosis as a potential confounder of mtDNA based phylogeographic inference in *Culicoides imicola* (Diptera: Ceratopogonidae), a vector of veterinary viruses. *Parasites and Vectors* 14, 100. <https://doi.org/10.1186/s1307-020-04568-3>

"Rollins, R.E., Schaper, S., Kahlhofer, C., Frangoulidis, D., Strau, A.F.T., Cardinale, M., Springer, A., Strube, C., Bakkes, D.K., Becker, N.S. & Chitimia-Dobler, L. 2021. Ticks (Acari: Ixodidae) on birds migrating to the island of Ponza, Italy, and the tick-borne pathogens they carry. *Ticks and Tick-borne Diseases* 12: 101590. <https://doi.org/10.1016/j.ttbdis.2020.101590>"

Sili, G., Byaruhanga, C., Horak, I., Steyn, H., Chaisi, M., Oosthuizen, M.C., & Neves, L. 2021. Ticks and tick-borne pathogens infecting livestock and dogs in Tchicala-Tcholoanga, Huambo Province, Angola. *Parasitology Research*. <https://doi.org/10.1007/s00436-020-07009-3>.

Snyman, J., Koekemoer, O., van Schalkwyk, A., van Vuren, P.J., Snyman, L., Williams, J., Venter, M. 2021. Epidemiology and genomic analysis of equine encephalosis virus detected in horses with clinical signs in South Africa, 2010-2017. *Viruses* 13 (398). <https://doi.org/10.3390/v13030398>.

Tjale, M.A., Liebenberg, J., Steyn, H., Van Kleef, M. & Pretorius, A. 2021. Transcriptome analysis of *Ehrlichia ruminantium* in the ruminant host at the tick bite site and in the tick vector salivary glands. *Ticks and Tick-borne Diseases* 12 (3) 101646. <https://doi.org/10.1016/j.ttbdis.2020.101646>

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phylogenetic analyses of formalin-fixed paraffin-embedded samples from the 2011 Rift Valley fever outbreak in South Africa, through sequencing of targeted regions. *Journal of Virological Methods*, Volume 287, 114003. <https://doi.org/10.1016/j.jviromet.2020.114003>

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Sabeta, C., Ukamaka E. & Mapatse, M. 2021. Limitations of Diagnostic Tests Using Rabies as an Example. *EC Veterinary Science*, Volume 6 Issue 6, 60-63. <https://www.econicon.com/ecve/ECVE-06-00382.php>
Abafe, O.A., Macheka, L.R., Abafe, O.T. & Chokwe T.B. 2021. Concentrations and human exposure assessment of per and polyfluoroalkyl substances in farmed marine shellfish in South Africa. *Chemosphere*, 281: 130985 <https://doi.org/10.1016/j.chemosphere.2021.130985>

Abafe, O.A., Macheka, L.R., & Olowoyo, J.O. 2021. Confirmatory Analysis of Per and Polyfluoroalkyl Substances in Milk and Infant Formula using UHPLC-MS/MS. *Molecules*, 26, 3664. <https://doi.org/10.3390/molecules26123664>
Faber, E., Tshilwane, S.I., van Kleef, M., Pretorius, A. 2021. Virulent African horse sickness virus serotype 4 interferes with the innate immune response in horse peripheral blood mononuclear cells in vitro. *Infection, Genetics and Evolution*, 91: 104836. <https://doi.org/10.1016/j.meegid.2021.104836>

"Mazloun, A., van Schalkwyk, A., Shotin, A., Igolkin, A., Shevchenko, I., Gruzdev, K.N., Vlasova, N. 2021. Comparative analysis of full genome sequences of African swine fever virus isolates taken from wild boars in Russia in 2019. *Pathogens*, 10(5), 521. <https://doi.org/10.3390/pathogens10050521>

Tjale, M.A., Liebenberg, J., Steyn, H., Van Kleef, M., & Pretorius, A. 2021. Transcriptome analysis of Ehrlichia ruminantium in the ruminant host at the tick bite site and in the tick vector salivary glands. *Ticks and Tick-borne Diseases* 12, 101646. <https://doi.org/10.1016/j.ttbdis.2020.101646>.

Lazarus, D.D., Opperman, P.A., Sirdar, M.M., Wolf, T.E., van Wyk, I., Rikhotso, O.B. & Fosgate, G.T. 2021. Improving foot-and-mouth disease control through the evaluation of goat movement patterns within the FMD protection zone of South Africa. *Small Ruminant Research*, 201, 106448.

Pedarrieu, A., Mellouli, F.E., Khallouki, H., Zro, K., Sebbar, G., Sghaier, S., Madani, H., Bouayed, N., Lo, M.M., Diop, M., Mamy, A.B.O.E., Barry, Y., Dakouo, M., Traore, A., Gagara, H., Souley, M.M., Acha, S., Mapaco, L., Chang'a, J., Nyakilinga, D., Lubisi, B.A., Tshabalala, T., Filippone, C., Heraud, J.M., Chamassy, S-B., Achiraffi, A., Keck, N., Grard, G., Mohammed, K.A.A., Alrizqi, A.M. & Cetre-Sossah, C., 2021. External quality assessment of Rift Valley fever diagnosis in countries at risk of the disease: African, Indian Ocean and Middle-East regions. *PLoS ONE* 16(5): e0251263. <https://doi.org/10.1371/journal.pone.0251263>

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"Laatamna, A., Bakkes, D.K. & Chitimia-Dobler, L. 2021. Morphological anomalies in Rhipicephalus sanguineus s.s. (Acari: Ixodidae) collected from dogs in steppe and high plateaus regions, Algeria. *Experimental and Applied Acarology* 83, 575-582. <https://doi.org/10.1007/s10493-021-00599-2> "

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and Evolution 162, 107178. <https://doi.org/10.1016/j.ympev.2021.107178>

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Anthony, T., Van Schalkwyk, A., Romito, M. Odendaal, L., Clift, S.J., & Davis, A.S. 2021. Vaccination with Rift Valley fever virus live attenuated vaccine strain Smithburn causes meningoencephalitis in alpaca. *Journal of Veterinary Diagnostic Investigation*, 33 (4). <https://doi.org/10.1177/10406387211015294>

Clift, S.J., Marti-Garcia, B., Phaswane, R.M., Mitchell, E.P., Josemans, A.I., Vorster, I., Koeppel, K.N. & Fehrsen, J. 2021. Polyclonal antibody-based immunohistochemical detection of intraleukocytic Theileria parasites in roan and sable antelopes. *Journal of Veterinary Diagnostic Investigation*. 1-10. <https://doi.org/10.1177/10406387211033272>

Denisov, S., Ippel, J.H., Castoldi, E. Mans, B.J., Hackeng, T.M., Dijkgraaf, I. 2021. Molecular basis of anticoagulant and anti-complement activity of the tick salivary protein Salp14 and its homologues. *Journal of Biological Chemistry* 297, 100865 1. <https://doi.org/10.1016/j.jbc.2021.100865>

Goosen, W., Moseley, M.H., Kerr, T.J., Potts, A. & Miller, M. 2021. The seroepidemiology of a neglected zoonotic and livestock pathogen in free-ranging bovinds: Leptospirosis in african buffaloes (*Syncerus caffer*). *Pathogens* 10, 1072. <https://doi.org/10.3390/pathogens10091072>

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Khasapane, N.G., Nkhebenyane, J.S., Kwenda, S., Khumalo, Z.T.H., Mtshali, P.S., Taioe, M.O. & Thekiso, O.M.M. 2021. Application of culture, PCR and PacBio sequencing for determination of microbial composition of milk from subclinical mastitis dairy cows of smallholder farms. *Open Life Sciences* 16, 800-808. <https://doi.org/10.1515/biol-2021-0080>

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Mokgophi, T.M, Gcebe. N., Fasina, F., & Adesiyun, A.A. 2021. Antimicrobial Resistance Profiles of *Salmonella* Isolates on chickens processed and retailed at outlets of the informal market in Gauteng Province, South Africa. *Pathogens* 10, 273. <https://doi.org/10.3390/pathogens10030273>

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wildlife hosts in South Africa. *Acta Tropica* 219, 105913. <https://doi.org/10.1016/j.actatropica.2021.105913>

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b) International conferences: 3

Tracing African swine fever: viral evolution and disease transmission in the Southern African Development Community. B. Martínez-López et al. Conference of Research workers in animal diseases (CRWAD), 2020.

MDV-specific phage-display libraries for epitope identification and the improved design of FMD vaccines. P. et al. IVVN vaccines for ruminants symposium". 26th April 2021.

An overview of recent FDM outbreaks in South Africa. L Heath et al. Scientific Meeting of the Global Foot-and Mouth Disease Research Alliance 1 - 3 November 2021 | Buenos Aires, Argentina

c) National conferences: 9

1. African swine fever among pig keepers in Gauteng

Province, 2019-2021. L De Boni et al. 18th Annual SASVEPM Congress 2021. 25-27 August 2021, South Africa.

2. The epidemiology of African Swine Fever outbreaks outside of the controlled area of South

Africa in 2016-2021. A Craig et al. 18th Annual SASVEPM Congress 2021. 25-27 August 2021, South Africa.

3. Assessment of risk factors for African swine fever in Gauteng province". K. Montsu et al. J. Van Heerden; C. Boshoff at SASVEPM, 2021. 18th Annual SASVEPM Congress 2021. 25-27 August 2021, South Africa.
4. The epidemiology of African Swine Fever outbreaks outside of the controlled area of South African swine fever - Livio Heath - South Africa
5. OIE Reference Laboratory Reports Activities, 2021 Africa in 2016-2021. L Heath et al. 18th Annual SASVEPM Congress 2021. 25-27 August 2021, South Africa
6. Development of a serological based vaccine matching technique for SAT 2 foot-and-mouth disease (FMD) viruses. T. Malesa et al. University of Pretoria Post-graduate Conference. July 2021.
7. Construction of three foot-and-mouth disease virus peptide phage display libraries for the identification of epitopes. NPB Sekgobela et al. University of Pretoria Post-graduate Conference. July 2021.
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9. Spatial risk mapping of foot-and-mouth disease occurrence and spread in South Africa (2007-2016). M Sirdar et al. 18th Annual SASVEPM Congress 2021. 25-27 August 2021, South Africa.

d) Other

(Provide website address or link to appropriate information): 2

Webinar: ASFV whole genome sequencing on different platforms – pitfalls and solution. Global African swine fever Research Alliance Scientific Communications Channel.

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Wallace, D.B., van Schalkwyk, A., Mather, A., Kara, P and Lubisi, A. Lumpy Skin Disease: History, Lessons and Perspectives (2021). Presentation by Dr Wallace as invited expert participant in FAO online LSD training course for SADC, 3 February to 3 March 2021 (Dr Wallace also participated in answering trainees' questions throughout the course and participated in closing webinar on 3rd March)

9. Additional comments regarding your report: