## Contents

1. General Introduction	1
1.1 Low reproductive performance	2
1.2 High juvenile mortality	4
1.3 High susceptibility to infectious diseases	4
References	5
2. High reproductive activity and high breeding success	
in free-ranging Namibian female cheetahs	9
2.1 Introduction	9
2.1.1 Reproductive activity	9
2.1.2 Breeding success	11
2.2 Materials and Methods	12
2.2.1 Study areas and study periods	12
2.2.2 Study animals	13
2.2.3 Immobilisation and anaesthesia	18
2.2.4 Ultrasonography	18
2.2.5 Radio- collaring	19
2.2.6 Ground follows and aerial tracking	20
2.2.7 Determination of cub survival and litter size at different ages	20
2.2.8 Statistics	21
2.3 Results	21
2.3.1 Sonomorphology and reproductive activity	21
2.3.2 Comparison of the reproductive state in free-ranging and captive females	29
2.3.3 Fecundity of free-ranging females	29
2.3.4 Breeding success	29
2.4 Discussion	31
2.4.1 Determination of reproductive stages by using ultrasonography	31

2.4.2 Free-ranging versus captive Namibian females	32
2.4.3 Reproductive activity in free-ranging females	33
2.4.4 Reproductive activity in captive females	34
2.4.5 Breeding success of free-ranging cheetahs	35
References	35

3. Investigation of possible mechanisms for reproductive inactivity in		
captive Namibian female cheetahs	39	
3.1 Introduction	39	
3.2 Materials and Methods	42	
3.2.1 Ultrasonography	42	
3.2.2 Body measurements	43	
3.2.3 Reproductive activity and annual rainfall	43	
3.2.4 Number of oestrous cycles	44	
3.2.5 Statistics	45	
3.3 Results	45	
3.3.1 Adrenal gland sizes in free-ranging and captive females	45	
3.3.2 Reproductive activity and annual rainfall	48	
3.3.3 Number of oestrous cycles	49	
3.3.4 Pathologies of the reproductive organs	52	
3.3.5 Asymmetric reproductive aging	54	
3.4 Discussion	56	
3.4.1 Stress levels in captive and free-ranging cheetah females	56	
3.4.2 Anoestrous periods as a consequence of endogenous rhythms	57	
3.4.3 Asymmetric reproductive aging	57	
References	60	

4. Good health status of free-ranging Namibian cheetahs and low		
prevalence of viral infections in the population	64	
4.1 Introduction	64	
4.2 Material and Methods	66	
4.2.1 Study animals	66	
4.2.2 Repeat sampling	66	
4.2.3 Evaluation of overall health status	67	
4.2.4 Ectoparasites	67	
4.2.5 Injuries	67	
4.2.6 Body mass, body length and body mass index	68	
4.2.7 Blood sampling and processing	69	
4.2.8 Immunofluorescence assays	70	
4.2.9 Quality control of antigen preparation, total nucleic acid extraction		
and PCR	72	
4.2.10 Enzyme-Linked Immunoabsorbent Assay	73	
4.2.11 Western Blot	78	
4.2.12 Rapid Fluorescent Focus Inhibition Test (RFFIT)	79	
4.2.13 Reverse Transcriptase PCR	79	
4.2.14 Statistics	79	
4.3. Results	80	
4.3.1 Symptoms of acute viral infections	80	
4.3.2 Nutritional and physical status	80	
4.3.3 Body mass index (BMI)	81	
4.3.4 Injuries	82	
4.3.5 Ectoparasites	82	
4.3.6 Serology by immunofluorescence assay	83	
4.3.7 Serology with ELISA	87	
4.3.8 Serology with Western Blot	88	
4.3.9 Serology with Rapid Fluorescent Focus Inhibition Test (RFFIT)	90	
4.3.10 Reverse Transcriptase (RT)-PCR	90	

4.4 Discussion	90
4.4.1 Absence of symptoms of acute viral infections	90
4.4.2 General health status	91
4.4.3 Injuries	92
4.4.4 Ectoparasites	92
4.4.5 Viral antibodies in free-ranging cheetahs	92
4.4.6 Viral antibodies in non-vaccinated captive cheetahs	95
4.4.7 Viral antibodies in vaccinated captive cheetahs	96
4.4.8 Prevalence of antibodies to FIV and FeLV	96
4.4.9 Prevalence of antibodies against rabies virus	97
References	99
5.Summary	104

6. Zusammenfassung	107

Appendix I Appendix II Acknowledgements Curriculum vitae Selbstständigkeitserklärung