

Brandimarti, M. E. Gray, R., Coulson, G., Cripps, J. K., Wilson, M. E., Death, C., Snape, M., Wimpenny, C., Silva, F. R. O., Miller, E. J., Scanes, E., Spielman, D., Thomas, G. and Herbert, C. A., 2020. Reference intervals for parameters of health of eastern grey kangaroos *Macropus giganteus* and management implications across their geographic range. – Wildlife Biology 2020: wlb.00692

## Appendix 1

Table A1. Site-specific mean haematological, glucose and serum protein values for eastern grey kangaroos *Macropus giganteus* from 11 populations; Nelson Bay Golf Course, (NBGC), Darlington Park (DP), Heritage Park (HP), Ainslie Majura Kangaroo Management Unit (KMU) (AM), Anglesea Golf Course (AGC), Serendip Sanctuary (SS), Woodlands Historic Park (WHP), Portland Aluminium (PA), Cowan (CW) and Calga (CL).

Variable	Unit	<i>P</i>	Site	n	Mean (SD)	Minimum	Maximum
RBC count	10 <sup>12</sup> /L	<0.001	NBGC	82	3.29 (0.69)		
			DP	54	3.05 (1.17)		
			HP	64	2.38 (0.59)		
			AM	28	3.5 (0.59)	2.44	4.5
			AGC	55	4.66 (0.6)		
			SS	80	3.67 (1.41)		
			PA	56	4.83 (0.42)		
			WHP	19	4.43		
			PGP	8	5.4		
			CW	19	5.11		
			CL	5	7.06		
WBC count	10 <sup>9</sup> /L	<0.001	NBGC	81	6.65 (1.69)		
			DP	57	7.76 (2.98)		
			HP	64	8.31 (2.34)		
			AM	28	3.38 (1.85)	0.86	8.32
			AGC	59	6.57 (1.89)		
			SS	80	3.54 (3.06)		
			PA	56	6.45 (1.9)		
			WHP	19	3.73		
			PGP	8	6		
			CW	19	7.34		
			CL	5	6.36		
Glucose	mmol/L	<0.001	NBGC	33	3.96 (0.72)	2.6	5.4
			DP	57	3.98 (1.42)		

			HP	42	2.9 (0.72)		
Neutrophil count	10 <sup>9</sup> /L	<0.001	NBGC	80	2.59 (1.09)		
			DP	44	2.48 (0.84)		
			HP	50	3.07 (1.2)		
			AM	23	0.82 (0.44)	0.17	2.15
			AGC	58	2.81 (0.72)		
			SS	56	1.86 (1.96)		
			PA	58	3.01 (1.46)		
			WHP	19	1.22		
			PGP	8	2.09		
			Lymphocyte count	10 <sup>9</sup> /L	<0.001	NBGC	81
DP	45	4.36 (2.05)					
HP	50	4.23 (1.65)					
AM	25	2.52 (1.68)				0.63	7.16
AGC	59	2.67 (1.18)					
SS	55	1.73 (1.28)					
PA	57	3.01 (0.94)					
WHP	19	2.22					
PGP	8	2.83					
Eosinophil count	10 <sup>9</sup> /L	<0.001				NBGC	77
			DP	46	0.52 (0.36)		
			HP	49	0.69 (0.37)		
			AM	24	0.19 (0.13)	0.02	0.44
			AGC	60	0.52 (0.29)		
			SS	50	0.1 (0.11)		
			PA	55	0.26 (0.17)		
			WHP	18	0.15		
			PGP	8	0.39		
			Monocytes count	10 <sup>9</sup> /L	<0.001	NBGC	78
DP	44	0.17 (0.17)					
HP	46	0.18					
AM	24	0.01 (0.02)				0	0.05
AGC	57	0.22					
SS	54	0.1(0.11)					
PA	57	0.14					
WHP	19	0.07					
PGP	8	0.21					
Basophil count	10 <sup>9</sup> /L	<0.01				NBGC	75
			DP	45	0.01 (0.02)		
			HP	46	0.02 (0.03)		
			AM	24	0 (0.01)	0	0.02
			AGC	59	0.03 (0.04)		
			SS	43	0.01 (0)		
			PA	17	0.04		
			WHP	18	0.01		
			PGP	8	0.01		
			HGB	g/L	<0.001	NBGC	81
DP	52	118.35 (11.6)					
HP	58	123.52 (11.56)					
AM	28	123.79 (19.44)				80	160

			AGC	55	136.91 (16.28)		
			SS	80	107.13 (41.23)		
			PA	57	132.68 (10.4)		
			WHP	19	132.84		
			PGP	8	160		
			CW	18	141.61		
			CL	5	174		
HCT	L/L	<0.001	NBGC	82	0.3 (0.07)		
			DP	59	0.25 (0.09)		
			HP	64	0.24 (0.06)		
			AM	28	0.32 (0.05)	0.22	0.43
			AGC	52	0.39 (0.04)		
			SS	67	0.3 (0.12)		
			PA	56	0.39 (0.03)		
			WHP	19	0.4		
			PGP	8	0.47		
			CW	19	0.43		
			CL	5	0.62		
MCV	f/L	<0.001	NBGC	83	91.9 (6.98)		
			DP	59	80.39 (14.73)		
			HP	64	100.68 (5.17)		
			AM	28	91.37 (4.35)	81.36	100
			AGC	54	82.72 (3.4)		
			SS	56	85.95 (3.93)		
			PA	57	81.23 (3.53)		
			WHP	19	89.84		
			PGP	8	86.38		
MCH	pg	<0.001	NBGC	83	43.17 (7.53)		
			DP	59	43.28 (16.94)		
			HP	64	54.11 (10.38)		
			AM	28	35.68 (4.23)	28.64	46.1
			AGC	53	29.45 (0.97)		
			SS	55	29.69 (1.68)		
			PA	59	27.97 (1.43)		
			WHP	19	30.05		
			PGP	8	29.63		
MCHC	g/L	<0.001	NBGC	83	473.46 (99.57)		
			DP	59	539.88 (206.47)		
			HP	64	537.28 (98.35)		
			AM	28	390.36 (42.79)	343.95	518.25
			AGC	55	355.2 (9.48)		
			SS	54	345.72 (11.84)		
			PA	58	342.52 (7.35)		
			WHP	19	335.42		
			PGP	8	343.25		
PLT	10 <sup>9</sup> /L	<0.001	NBGC	75	150.03 (33.44)		
			DP	54	169.04 (72.24)		
			HP	63	147.94 (44.45)		
			AM	28	156.43 (71.42)	36	312
			AGC	53	144.32 (56.44)		

			SS	29	217.55 (79.87)	76	449
			PA	21	187.1 (44.08)	136	290
			WHP	19	129.79		
			PGP	8	173		
NRBC count	10 <sup>9</sup> /L	<0.001	NBGC	17	0.04		
			DP	25	0.01 (0.01)		
			AM	26	0.03 (0.03)	0	0.1
Albumin	g/L	<0.001	NBGC	70	28.4 (6.5)		
			DP	30	33.45 (3.06)	27.92	39
			AGC	57	29.89 (2.97)		
			SS	79	29.9 (4.68)		
			PA	73	33.74 (3.35)		
			WHP	19	31.68		
			PGP	8	36.13		
			CW	22	34.41 (3.46)	27	40
			CL	5	34		
TP	g/L	<0.001	NBGC	27	66.31 (6.31)	50.57	76.62
			DP	27	65.24 (4.56)	55.13	73.88
			AGC	60	61.47 (5.51)		
			SS	79	56.42 (10.59)		
			PA	74	58.76 (5.55)		
			WHP	18	56.5		
			PGP	8	67		
			CW	22	65.05 (4.1)	58	74
			CL	5	67.4		
Globulin	g/L	<0.001	NBGC	27	31.94 (5.22)	40.03	5.22
			DP	29	31.03 (4.57)	22.51	39.39
			AGC	57	30.85 (4.39)		
			SS	79	26.39 (7.45)		
			PA	68	25.34 (2.87)		
			WHP	19	25.84		
			PGP	8	30.88		
			CW	22	30.64 (4.33)	24	39
			CL	5	33.4		

#### Footnotes

RBC, red blood cell count; WBC, white blood cell count; HGB, haemoglobin; HCT, haematocrit; MCV, mean corpuscular volume; MCH, mean corpuscular haemoglobin; MCHC, mean corpuscular haemoglobin concentration; PLT, platelets; NRBC, nucleated red blood cell count; TP, total protein; SD, standard deviation.

Table A2. Random forest (RF) model validation metrics exploring the effects of biotic and abiotic factors on haematological, glucose and serum protein values of 11 populations of eastern grey kangaroos *Macropus giganteus*; Nelson Bay Golf Course, (NBGC), Darlington Park (DP), Heritage Park (HP), Ainslie Majura Kangaroo Management Unit (KMU) (AM), Anglesea Golf Course (AGC), Serendip Sanctuary (SS), Woodlands Historic Park (WHP), Portland Aluminium (PA), Cowan (CW) and Calga (CL). The percentage of variation explained (PVE) indicates how well ‘out of the bag’ predictions explain the variance of the training dataset. Root mean square error (RMSE) indicates how well our RF predicts test set outcomes. The PVE from both the real (non-random data) model and the random model were compared and a p-value generated to evaluate model significance (Evans and Cushman 2009, Murphy et al. 2010).

Parameter	PVE	p	RMSE
RBC count	59.8	<0.001	0.81
WBC count	35.4	<0.001	2.38
Glucose	29.1	<0.001	0.54
Neutrophil count	10	<0.001	1.24
Lymphocyte count	14.3	<0.001	1.58
Eosinophil count	22.3	<0.001	0.32
Monocyte count	11.2	<0.001	0.19
Basophil count	-2.3	<0.001	0.04
HGB	28.7	<0.001	23.04
HCT	53.4	<0.001	0.07
MCV	54.4	<0.001	6.26
MCH	70.3	<0.001	6.36
MCHC	66.5	<0.001	69.33
PLT	-4.3	<0.05	79.58
NRBC count	-22.3	NS	0.054
Albumin	39.7	<0.001	3.23
TP	26.9	<0.001	5.74
Globulin	34.8	<0.001	4.33

#### Footnotes

RBC, red blood cell count; WBC, white blood cell count; HGB, haemoglobin; HCT, haematocrit; MCV, mean corpuscular volume; MCH, mean corpuscular haemoglobin; MCHC, mean corpuscular haemoglobin concentration; PLT, platelets; NRBC, nucleated red blood cell count; TP, total protein; PVE, percentage of variation explained; RMSE, root mean squared error; p, significance.