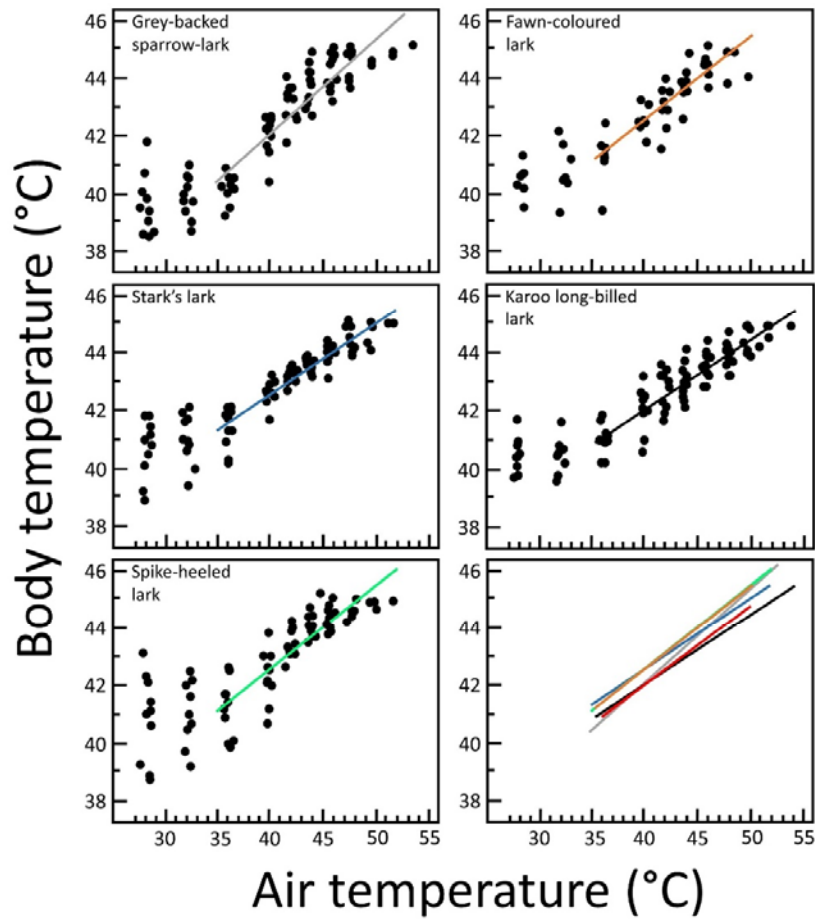


Supplemental Table 1. Mass-specific resting metabolic rate (RMR) and evaporative water loss (EWL) rate at high T_a in six lark species from the arid zone of southern African. Means, SD and N are reported.

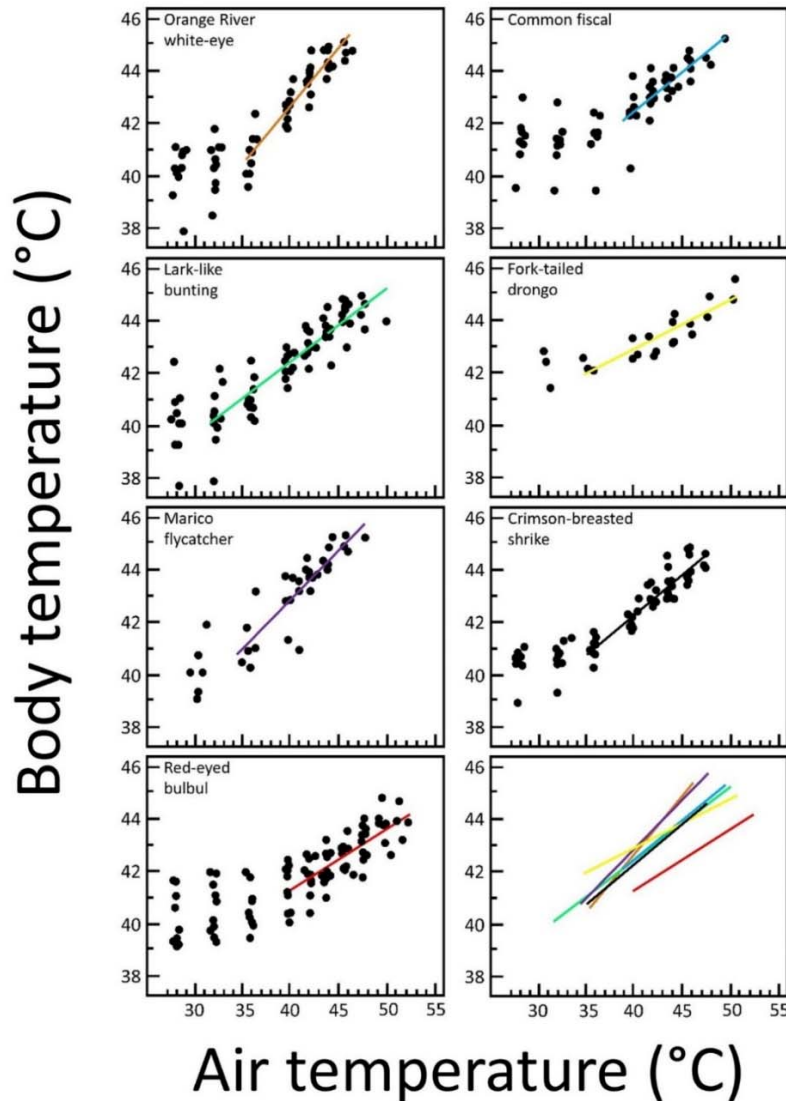
Variable	Grey-backed sparrow-lark	Stark's Lark	Fawn-coloured lark	Spike-heeled lark	Red lark (males)	Karoo long-billed lark
RMR						
Min. RMR (mW g ⁻¹)	15.4±2.1 (9)	14.1±1.7 (10)	14.0±3.9 (6)	15.1±5.8 (10)	10.3±2.1 (9)	12.5±1.6 (9)
RMR slope (mW g ⁻¹ °C ⁻¹)	0.69	0.59	0.45	0.37	0.29	0.44
Max. RMR (mW g ⁻¹)	24.0±8.2 (9)	23.8±5.7 (4)	19.0±5.9 (3)	19.4±4.4 (4)	13.1±2.0 (5)	17.3±1.7 (7)
EWL						
Min. EWL (mg h ⁻¹ g ⁻¹)	5.0±2.6 (10)	4.5±1.7 (10)	6.7±3.6 (6)	6.4±1.8 (10)	6.6±3.1 (9)	5.6±1.7 (9)
EWL slope (mg h ⁻¹ g ⁻¹ °C ⁻¹)	5.05	5.50	3.65	4.69	2.06	3.92
Max. EWL (mg h ⁻¹ g ⁻¹)	66.3 (2)	71.2±29.6 (4)	51.7±26.4 (3)	52.8±19.9 (4)	39.7±2.7 (5)	56.8±18.3 (3)

Supplemental Table 2. Mass-specific resting metabolic rate (RMR) and evaporative water loss (EWL) rate at high T_a in seven passerine species from the arid zone of southern African. Means, SD and N are reported.

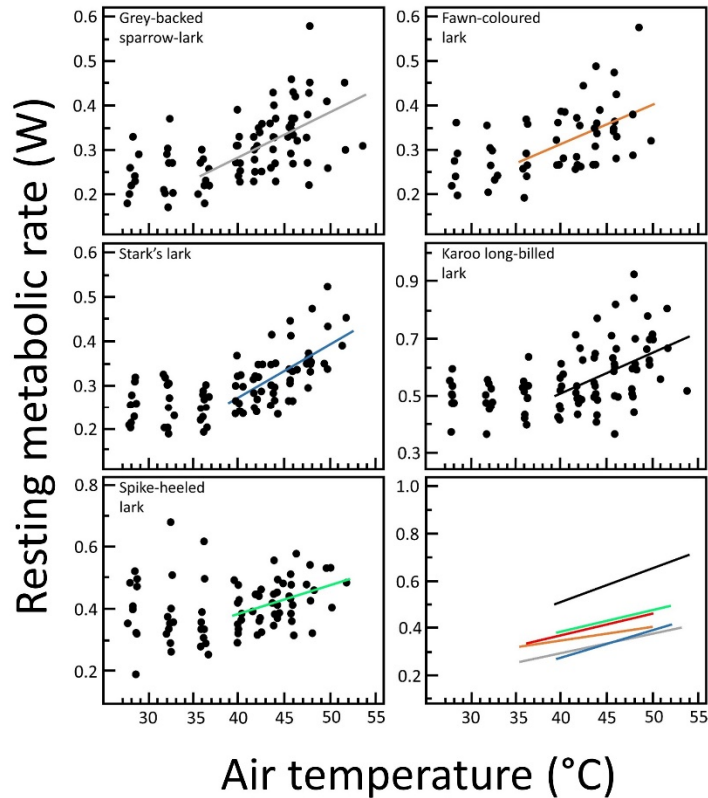
Variable	Orange River white-eye	Lark-like bunting	Marico flycatcher	Red-eyed bulbul	Southern fiscal	Fork-tailed drongo	Crimson-breasted shrike
RMR							
Min. RMR (mW g ⁻¹)	24.3±2.7 (10)	17.1±2.8 (10)	14.6±5.9 (7)	15.3±3.5 (9)	13.2±1.7 (8)	12.1±1.1 (3)	12.8±1.5 (9)
RMR slope (mW g ⁻¹ °C ⁻¹)	1.64	0.84	0.37	0.85	1.34	1.30	1.29
Max. RMR (mW g ⁻¹)	39.8±2.0 (4)	25.8±1.4 (4)	18.3±3.5 (3)	28.6±6.8 (7)	22.6±3.3 (7)	25.7 (2)	23.7±11.6 (9)
			22.0 (1)		30.2 (1)		
EWL							
Min. EWL (mg h ⁻¹ g ⁻¹)	15.6±6.4 (10)	7.7±2.9 (10)	6.8±2.7 (7)	7.3±2.4 (9)	6.8±1.8 (9)	5.9±1.5 (3)	5.0±1.1 (9)
EWL slope (mg h ⁻¹ g ⁻¹ °C ⁻¹)	12.4	7.8	4.0	5.8	9.3	4.8	6.1
Max. EWL (mg h ⁻¹ g ⁻¹)	113.9 ±10.9 (4)	76.4±12.1 (4)	35.6±4.7 (3)	85.9±38.0 (7)	65.0 (2)	59.5 (2)	41.9±17.8 (9)
			44.5 (1)		120.5 (1)		



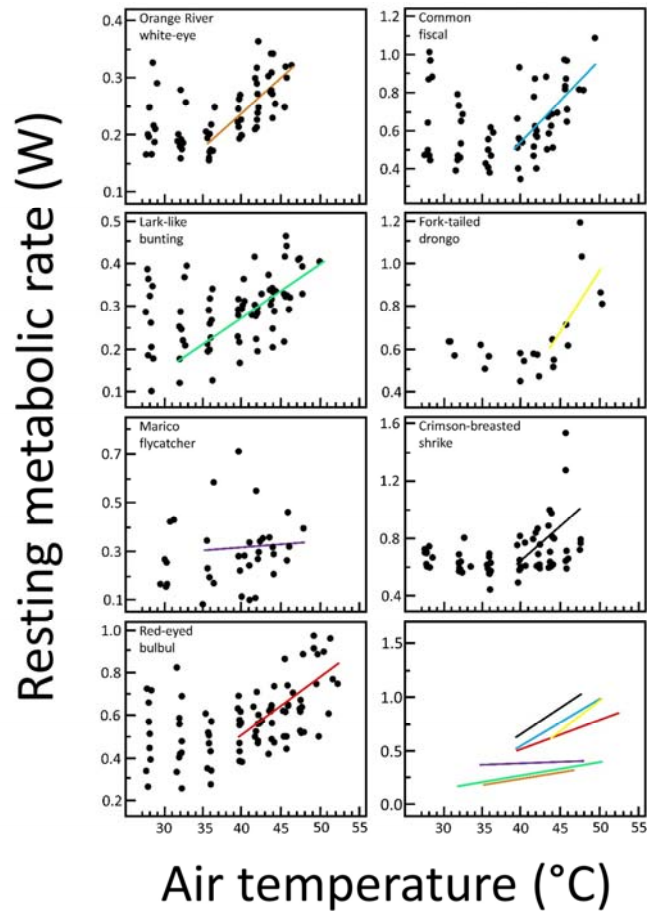
Supplemental Figure 1: Relationship between body temperature (T_b) and T_a in five larks from the arid zone of southern Africa. Data are for grey-backed sparrow-larks (*Eremopterix verticalis*), Stark's lark (*Spizocorys starki*), spike-heeled lark (*Chersomanes albofasciata*), fawn-coloured lark (*Calendulauda africanoides*), and Karoo long-billed lark (*Certhilauda subcoronata*). For each species, the solid line is the upper portion of the segmented linear regression model that provided the best fit. The bottom right panel shows the regression models for all five species plotted together for comparative purposes and includes the corresponding relationship from red larks in red (*Calendulauda burra*; Kemp and McKechnie, 2019).



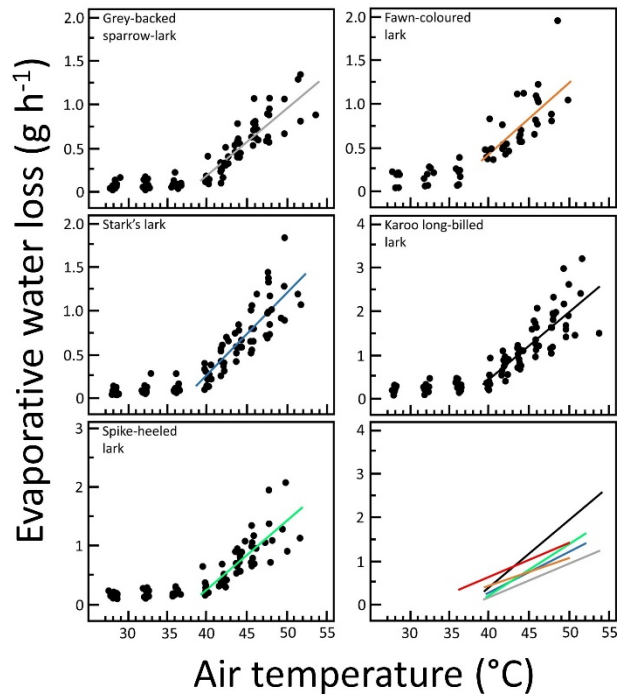
Supplemental Figure 2: Relationship between body temperature (T_b) and T_a in seven passerine species from the arid zone of southern African. Data are for Orange River white-eyes (*Zosterops pallidus*), lark-like buntings (*Emberiza impetuanii*), Marico flycatchers (*Melaenornis mariquensis*), red-eyed bulbuls (*Pycnonotus nigricans*), southern fiscals (*Lanius collaris*), fork-tailed drongos (*Dicrurus adsimilis*), and crimson-breasted shrikes (*Laniarius atrococcineus*). For each species, the solid line is the upper portion of the segmented linear regression model that provided the best fit. The bottom right panel shows the regression models for all five species plotted together for comparative purposes.



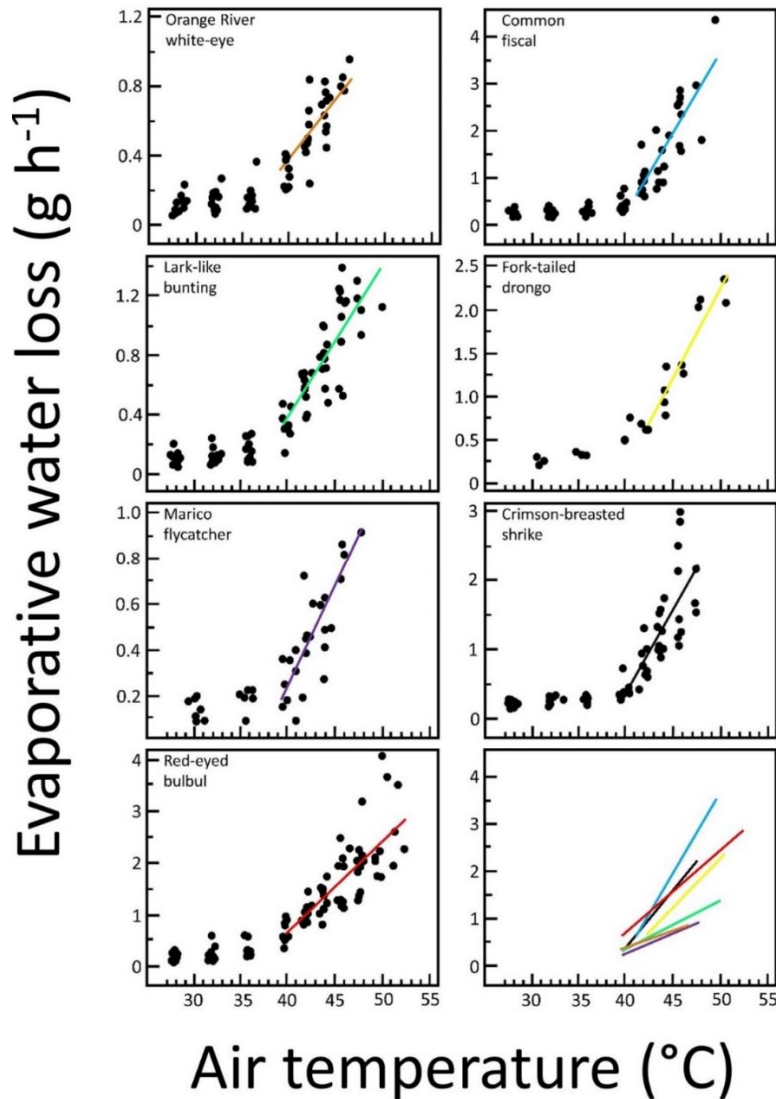
Supplemental Figure 3: Relationship between resting metabolic rate (RMR) and T_a in five lark species from the arid zone of southern Africa. Data are for grey-backed sparrow-larks (*Eremopterix verticalis*), Stark's lark (*Spizocorys starki*), spike-heeled lark (*Chersomanes albofasciata*), fawn-coloured lark (*Calendulauda africanoides*), and Karoo long-billed lark (*Certhilauda subcoronata*). For each species, the solid line is the upper portion of the segmented linear regression model that provided the best fit. Note that the scaling of the y-axes varies among panels. The bottom right panel shows the regression models for all five species plotted together for comparative and includes the corresponding relationship from red larks in red (*Calendulauda burra*; Kemp and McKechnie, 2019)



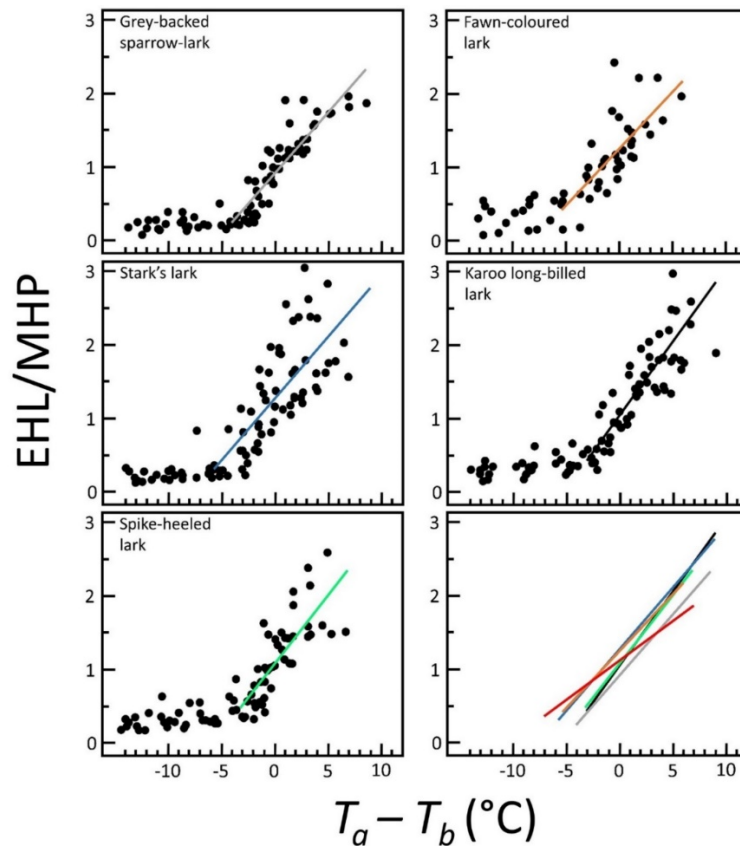
Supplemental Figure 4: Relationship between resting metabolic rate (RMR) and T_a in seven passerine species from the arid zone of southern African. Data are for Orange River white-eyes (*Zosterops pallidus*), lark-like buntings (*Emberiza impetuanii*), Marico flycatchers (*Melaenornis mariquensis*), red-eyed bulbuls (*Pycnonotus nigricans*), southern fiscals (*Lanius collaris*), fork-tailed drongos (*Dicrurus adsimilis*), and crimson-breasted shrikes (*Laniarius atrococcineus*). For each species, the solid line is the upper portion of the segmented linear regression model that provided the best fit. Note that the scaling of the y-axes varies among panels. The bottom right panel shows the regression models for all five species plotted together for comparative purposes.



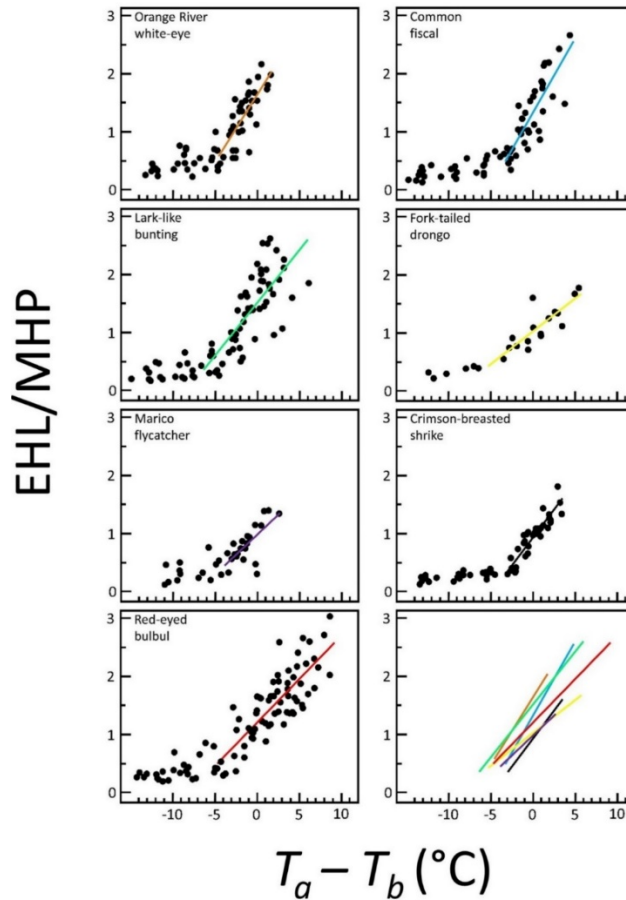
Supplemental Figure 5: Relationship between evaporative water loss and ambient temperature in five lark species from the arid zone of southern Africa. Data are for grey-backed sparrow-larks (*Eremopterix verticalis*), Stark's lark (*Spizocorys starki*), spike-heeled lark (*Chersomanes albofasciata*), fawn-coloured lark (*Calendulauda africanoides*), and Karoo long-billed lark (*Certhilauda subcoronata*). For each species, the solid line is the upper portion of the segmented linear regression model that provided the best fit. Note that the scaling of the y-axes varies among panels. The bottom right panel shows the regression models for all five species plotted together for comparative purposes and includes the corresponding relationship from red larks in red (*Calendulauda burra*; Kemp and McKechnie, 2019).



Supplemental Figure 6: Relationship between evaporative water loss and ambient temperature in seven passerine species from the arid zone of southern African. Data are for Orange River white-eyes (*Zosterops pallidus*), lark-like buntings (*Emberiza impetواني*), Marico flycatchers (*Melaenornis mariquensis*), red-eyed bulbuls (*Pycnonotus nigricans*), southern fiscals (*Lanius collaris*), fork-tailed drongos (*Dicrurus adsimilis*), and crimson-breasted shrikes (*Laniarius atrococcineus*). For each species, the solid line is the upper portion of the segmented linear regression model that provided the best fit. Note that the scaling of the y-axes varies among panels. The bottom right panel shows the regression models for all five species plotted together for comparative purposes.



Supplemental Figure 7: Relationship between evaporative heat loss/metabolic heat production (EHL/MHP) against the gradient between air temperature (T_a) and body temperature (T_b) in five lark species from the arid zone of southern Africa. Data are for grey-backed sparrow-larks (*Eremopterix verticalis*), Stark's lark (*Spizocorys starki*), spike-heeled lark (*Chersomanes albofasciata*), fawn-coloured lark (*Calendulauda africanoides*), and Karoo long-billed lark (*Certhilauda subcoronata*). For each species, the solid line is the upper portion of the segmented linear regression model that provided the best fit. The bottom right panel shows the regression models for all five species plotted together for comparative purposes includes the corresponding relationship from red larks in red (*Calendulauda burra*; Kemp and McKechnie, 2019).



Supplemental Figure 8: Relationship between evaporative heat loss/metabolic heat production (EHL/MHP) against the gradient between air temperature (T_a) and body temperature (T_b) in seven passerine species from the arid zone of southern African. Data are for Orange River white-eyes (*Zosterops pallidus*), lark-like buntings (*Emberiza impetuanii*), Marico flycatchers (*Melaenornis mariquensis*), red-eyed bulbuls (*Pycnonotus nigricans*), southern fiscals (*Lanius collaris*), fork-tailed drongos (*Dicrurus adsimilis*), and crimson-breasted shrikes (*Laniarius atrococcineus*). For each species, the solid line is the upper portion of the segmented linear regression model that provided the best fit. Note that the scaling of the y-axes varies among panels. The bottom right panel shows the regression models for all five species plotted together for comparative