SI-Table 1. Descriptions of predictors, predicted effects, used variable and units of all predictors in the analysis.

|  |  |  |  |
| --- | --- | --- | --- |
| Predictor | Predicted effect | Variable | Units |
| Habitat overlap with greater kudu  | positive  | Pianka's index | - |
| Habitat overlap with warthog  | positive | Pianka's index | - |
| Relative density of greater kudu  | positive | FBII | - |
| Relative density of warthog | positive | FBII | - |
| Mammalian species richness | negative | Species richness | N |
| Mammalian species evenness | negative | Pielou’s index | - |
| Mammalian species diversity | negative | Shannon's index | - |
| Density of cattle | positive | Density of cattle | N/km2 |

FBII=frequency-based indirect index

SI-Table 2. Summary statistics per sub-district in the Afar Region, Ethiopia, of cattle habitat use overlap with greater kudu and warthog (Pianka's Niche Overlap), relative abundance of greater kudu and warthog (FBII), and species richness, evenness (Pielou’s species evenness, J’) and diversity (Shannon's diversity index, H’).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sub-district | Cattle habitat overlap | Relative abundance | Species | Cattle dung density /km2 |
| Kudu | Warthog | Kudu | Warthog | Richness | Evenness | Diversity |
| Abosena A | 0 | 0 | 0 | 0 | 5 | 0.79 | 1.28 | 6.0 X 103 |
| Adalalita | 0 | 0 | 0 | 0 | 5 | 0.70 | 1.13 | 5.7 X 103 |
| Adalil | 0 | 0 | 0 | 0 | 5 | 0.69 | 1.12 | 4.8 X 103 |
| Ade Ar Ena  | 0 | 0 | 0 | 0 | 5 | 0.78 | 1.26 | 6.4 X 103 |
| Adibaro | 0 | 0 | 0 | 0 | 5 | 0.69 | 1.11 | 6.5 X 103 |
| Askomana  | 0 | 0 | 0 | 0 | 5 | 0.90 | 1.12 | 4.7 X 103 |
| Beri | 0 | 0 | 0 | 0 | 5 | 0.71 | 1.15 | 6.8 X 103 |
| Bilu | 0 | 0 | 0 | 0 | 5 | 0.72 | 1.16 | 4.8 X 103 |
| Bira Eforo | 0 | 0 | 0 | 0 | 5 | 0.64 | 1.03 | 4.7 X 103 |
| Bolhamo | 0 | 0 | 0 | 0 | 5 | 0.68 | 1.09 | 4.8 X 103 |
| Buri | 0.3 | 0.47 | 0.29 | 0.18 | 18 | 0.69 | 1.98 | 9.3 X 103 |
| Daleti | 0 | 0 | 0 | 0 | 5 | 0.74 | 1.19 | 4.2 X 103 |
| Deaka | 0 | 0 | 0 | 0 | 5 | 0.76 | 1.23 | 6.8 X 103 |
| Debel Na H | 0 | 0 | 0 | 0 | 5 | 0.84 | 1.35 | 8.2 X 103 |
| Diduba | 0.95 | 0.84 | 0.93 | 0.79 | 12 | 0.63 | 2.05 | 5.3 X 103 |
| Dikikana B | 0 | 0 | 0 | 0 | 5 | 0.52 | 0.72 | 3.6 X 103 |
| Gahertu | 0 | 0 | 0 | 0 | 5 | 0.76 | 1.23 | 5.4 X 103 |
| Geberoch | 0 | 0 | 0 | 0 | 5 | 0.79 | 1.11 | 6.7 X 103 |
| Halbina Wale | 0 | 0 | 0 | 0 | 5 | 0.63 | 1.02 | 7.2 X 103 |
| Haresa | 0 | 0 | 0 | 0 | 5 | 0.81 | 1.30 | 6.7 X 103 |
| Hintmegetana  | 0 | 0 | 0 | 0 | 5 | 0.72 | 1.17 | 6.9 X 103 |
| Hotemerona  | 0 | 0 | 0 | 0 | 5 | 0.81 | 1.3 | 4.0 X 103 |
| Kahrtuna T | 0 | 0 | 0 | 0 | 4 | 0.63 | 0.87 | 6.9 X 103 |
| Kailuna A K | 0 | 0.21 | 0 | 0.31 | 12 | 0.75 | 1.79 | 4.6 X 103 |
| Rumaytu | 0 | 0 | 0 | 0 | 4 | 0.60 | 0.84 | 4.3 X 103 |
| Sabure | 0.75 | 0.65 | 0.67 | 0.52 | 12 | 0.69 | 1.66 | 7.2 X 103 |
| Sebulina W | 0 | 0 | 0 | 0 | 5 | 0.52 | 0.72 | 5.6 X 103 |
| Seganto | 0 | 0 | 0 | 0 | 5 | 0.76 | 1.22 | 4.9 X 103 |
| Sehana M | 0 | 0 | 0 | 0 | 4 | 0.73 | 1.02 | 3.2 X 103 |
| Sergat | 0 | 0 | 0 | 0 | 5 | 0.79 | 0.96 | 3.7 X 103 |
| Serkamo | 0.41 | 0.47 | 0.29 | 0.61 | 16 | 0.52 | 1.99 | 6.0 X 103 |
| Wantuna F | 0 | 0 | 0 | 0 | 5 | 0.78 | 1.08 | 5.5 X 103 |
| Weydelelina  | 0 | 0 | 0 | 0 | 5 | 0.46 | 0.73 | 5.5 X 103 |
| Wiena A | 0 | 0 | 0 | 0 | 5 | 0.6 | 0.97 | 5.2 X 103 |

SI-Table 3.Summary of selected candidate models (delta AIC < 5 and weight > 0.5) and the global model with their variables (+ indicates the inclusion of the variable in the model) on the number of sub-district bTB infected Ethiopian cattle.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | b | Pielou’s species evenness | Shannon's species diversity | Habitat overlap with kudu | logLik  | AIC | δ AIC | weight |
| Global model  | 2.4 | + | + | + | -64.4 | 140.9 | 1.98 | 0.14 |
| Model 1 | 2.5 | + |  | + | -64.8 | 138.9 | 0.00 | 0.39 |
| Model 2 | 2.3 | + | + |  | -65.4 | 140.2 | 1.30 | 0.20 |
| Model 3 | 1.3 |  |  | + | -66.7 | 140.3 | 1.37 | 0.19 |
| Model 4 | 1.2 |  | + | + | -66.8 | 142.9 | 3.94 | 0.06 |

Kudu=greater kudu

SI-Table 4. Summary statistics of the selected candidate models models (delta AIC < 5 and weight > 0.5) and the global model, with regression coefficient (b with 95% confidence intervals), Odds Ratio (OR, 95% confidence intervals) and p-value for the effect of species evenness (J’), species diversity (H’) and cattle-greater kudu habitat overlap on the number of sub-district bTB incidence in Ethiopian cattle as obtained from GLMMs.

|  |  |
| --- | --- |
| Model | Number of bTB positive animal |
| Variables  | b (95%CI) | OR(95%CI) | p-value |
| Global model | Pielou’s species evenness | -2.0(-3.7-0.2) | 0.2(0.1-1.8) | 0.027\* |
|  | Shannon's species diversity | 0.3(0.2-1.0) | 2.5(0.6-3.2) | 0.367 |
|  | Habitat overlap with kudu | 0.7(0.3-1.6) | 2.6(1.1-6.3) | 0.014\* |
| Model 1 | Pielou’s species evenness | -1.7(-3.4-0.2) | 0.3(0.1-0.9) | 0.043\* |
|  | Habitat overlap with kudu | 1.1(0.5-1.6) | 3.7(1.6-4.9) | < 0.001\*\*\* |
| Model 2 | Pielou’s species evenness | -2.5(-4.2-0.9) | 0.1(0.01-0.4) | 0.002\*\* |
|  | Shannon's species diversity | 0.7(0.3-1.1) | 2.7(1.3-2.9) | < 0.001\*\*\* |
| Model 3 | Habitat overlap with kudu | 1.2(0.6-1.7) | 3.3(1.9-5.5) | < 0.001\*\*\* |
| Model 4 | Shannon's species diversity  | 0.1(0.06-0.7) | 1.1(0.5-2.0) | 0.907 |
|  | Habitat overlap with kudu | 1.2(0.3-2.0) | 3.2(1.3-7.6) | 0.008\*\* |

Kudu=greater kudu; \* *P*< 0.05; \*\* *p* < 0.01; \*\*\* *p* < 0.001

SI-Table 5: List of wild mammalian species identified in the study area.

|  |  |  |  |
| --- | --- | --- | --- |
| No | **English Name**  | **Scientific Name**  | **Family** |
|  | Beisa Oryx  | *Oryx beisa beisa* | [Bovidae](http://en.wikipedia.org/wiki/Bovidae) |
|  | Soemmerings gazelle  | *Gazella soemmeringi*  | [Bovidae](http://en.wikipedia.org/wiki/Bovidae) |
|  | Defassa waterbuck  | *Kobus defassa*  | [Bovidae](http://en.wikipedia.org/wiki/Bovidae) |
|  | Greater Kudu  | *Strepsiceros strepsiceros*  | [Bovidae](http://en.wikipedia.org/wiki/Bovidae) |
|  | Salt's dik-dik | *Madoqua saltiana* | [Bovidae](http://en.wikipedia.org/wiki/Bovidae) |
|  | Bush buck  | *Tragelaphus scriptus*  | [Bovidae](http://en.wikipedia.org/wiki/Bovidae) |
|  | Warthog  | *Phacochoerus aethiopicus*  | [Suidae](http://en.wikipedia.org/wiki/Suidae) |
|  | Ethiopian hare  | *Lepus habessinicus*  | [Leporidae](http://en.wikipedia.org/wiki/Leporidae) |
|  | Baboon  | *Papio anubis*  | [Cercopithecidae](http://en.wikipedia.org/wiki/Cercopithecidae) |
|  | Grey duiker  | *Sylvicapra grimmia*  | [Bovidae](http://en.wikipedia.org/wiki/Bovidae) |
|  | Zebra | *Equus grevyi* | [Equidae](https://en.wikipedia.org/wiki/Equidae) |
|  | Gerenuk | *Litocranius walleri* | [Bovidae](http://en.wikipedia.org/wiki/Bovidae) |
|  | Vervet monkeys | *Cercopithecus aethiops* | [Cercopithecidae](https://en.wikipedia.org/wiki/Cercopithecidae) |