**Additional file 1:**

**Table S1.** Location of camera-trapping sites distributed in Nanling National Nature Reserve, Guangdong Province, China.

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Latitude** | **Longitude** | **Elevation (m)** |
| C01 | 24°56′2.65″ | 113° 1′4.63″ | 1150 |
| C02 | 24°56.053″ | 113°01.304″ | 1245 |
| C03 | 24°55′53.69″ | 113°00′50.25″ | 1118 |
| C04 | 24°55′55.99″ | 113°00′58.83″ | 1191 |
| C05 | 24°56′02.84″ | 113°00′56.65″ | 1233 |
| C06 | 24°55′37.78″ | 113°00′42.46″ | 1210 |
| C07 | 24°55′36.24″ | 113°00′35.43″ | 1228 |
| C08 | 24°55′33.57″ | 113°00′47.5″ | 1222 |
| C09 | 24°53′22.86″ | 113°01′07.27″ | 1470 |
| C10 | 24°53′31.01″ | 113°00′56.45″ | 1551 |
| C11 | 24°56′03.64″ | 113°00′20.17″ | 1180 |
| C12 | 24°56′42.2″ | 113°00′29.56″ | 1478 |
| C13 | 24°56′42.98″ | 112°59′34.42″ | 1364 |
| C14 | 24°55′32.87″ | 113°01′42.94″ | 1066 |
| C15 | 24°55′58.34″ | 113°01′24.79″ | 1321 |
| C16 | 24°55.738″ | 113°00.705″ | 1071 |
| C17 | 24°53′28.56″ | 113°01′09.4″ | 1518 |
| C18 | 24°53′31.12″ | 113°00′54.63″ | 1572 |
| C19 | 24°53′31.00″ | 113°01′16.00″ | 1450 |
| C20 | 24°53′32.00″ | 113°01′22.00″ | 1428 |
| C21 | 24°53′34.31″ | 113°01′37.29″ | 1282 |
| C22 | 24°53′34.56″ | 113°01′46.54″ | 1309 |
| C23 | 24°53′32.44″ | 113°01′5.04″ | 1304 |
| C24 | 24°53′32.21″ | 113°01′54.78″ | 1256 |

**Table S2.** AIC values and AIC weights of each of all models used for abundance analyses.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Season** | **Species** | **Model** | **Number of parameters** | **AIC** | **ΔAIC** | **AIC weight** |
| Winter | Silver Pheasant | ZIP | 4 | 192.11 | 0 | 0.53 |
|  |  | NB | 4 | 192.39 | 0.28 | 0.46 |
|  |  | Null | 3 | 200.29 | 8.17 | 0.01 |
|  |  | Poisson | 3 | 214.74 | 22.63 | 0.00 |
|  | White-necklaced Partridge | Null | 3 | 149.58 | 0 | 0.70 |
|  |  | ZIP | 4 | 151.5 | 1.92 | 0.27 |
|  |  | NB | 4 | 155.53 | 5.95 | 0.04 |
|  |  | Poisson | 3 | 168.19 | 18.61 | 0.00 |
|  | Cabot's Tragopan | Poisson | 3 | 86.89 | 0 | 1.00 |
|  |  | Null | 2 | 100.58 | 13.69 | 0.00 |
| Spring | Silver Pheasant | NB | 4 | 357.44 | 0 | 0.51 |
|  |  | Null | 3 | 357.55 | 0.11 | 0.48 |
|  |  | ZIP | 4 | 365.52 | 8.08 | 0.01 |
|  |  | Poisson | 3 | 365.7 | 8.26 | 0.01 |
|  | White-necklaced Partridge | Null | 3 | 158.96 | 0 | 0.61 |
|  |  | ZIP | 4 | 160.57 | 1.61 | 0.27 |
|  |  | NB | 4 | 162.65 | 3.69 | 0.10 |
|  |  | Poisson | 3 | 165.67 | 6.71 | 0.02 |
|  | Cabot's Tragopan | NB | 4 | 210.96 | 0 | 0.54 |
|  |  | Null | 3 | 213.31 | 2.35 | 0.17 |
|  |  | ZIP | 4 | 213.53 | 2.57 | 0.15 |
|  |  | Poisson | 3 | 213.61 | 2.65 | 0.14 |
| Summer | Silver Pheasant | Null | 3 | 440.19 | 0 | 0.50 |
|  |  | NB | 4 | 440.2 | 0.014 | 0.49 |
|  |  | ZIP | 4 | 448.59 | 8.401 | 0.01 |
|  |  | Poisson | 3 | 496.91 | 56.722 | 0.00 |
|  | White-necklaced Partridge | Null | 3 | 218.63 | 0 | 0.57 |
|  |  | NB | 4 | 220.08 | 1.45 | 0.27 |
|  |  | ZIP | 4 | 221.16 | 2.53 | 0.16 |
|  |  | Poisson | 3 | 253.66 | 35.03 | 0.00 |
|  | Cabot's Tragopan | ZIP\* | 4 | 234.38 | 0 | 0.70 |
|  |  | NB | 4 | 237.31 | 2.93 | 0.16 |
|  |  | Null | 3 | 237.55 | 3.17 | 0.14 |
|  |  | Poisson | 3 | 252.65 | 18.27 | 0.00 |
| Fall | Silver Pheasant | Null | 3 | 330.52 | 0 | 0.58 |
|  |  | NB | 4 | 331.18 | 0.65 | 0.42 |
|  |  | ZIP | 4 | 345.72 | 15.19 | 0.00 |
|  |  | Poisson | 3 | 360.17 | 29.64 | 0.00 |
|  | White-necklaced Partridge | Null | 3 | 207.1 | 0 | 0.63 |
|  |  | ZIP | 4 | 208.59 | 1.49 | 0.30 |
|  |  | NB | 4 | 211.58 | 4.48 | 0.07 |
|  |  | Poisson | 3 | 225.24 | 18.14 | 0.00 |
|  | Cabot's Tragopan | Null | 3 | 196.13 | 0 | 0.60 |
|  |  | ZIP | 4 | 198.13 | 2 | 0.22 |
|  |  | NB | 4 | 199.7 | 3.57 | 0.10 |
|  |  | Poisson | 3 | 200.3 | 4.17 | 0.08 |

Note: \* *N*-mixture model with a marginal model fit. Model abbreviation: NB, negative binomial *N*-mixture model; ZIP, zero-inflated Poisson *N*-mixture model; Poisson, Poisson *N*-mixture model; Null, intercept only model. Note that ZIP *N*-mixture model of Cabot’s Tragopan in summer showed a marginal model fit (*P* = ~ 0.05). Thus, we excluded the ZIP *N*-mixture model and used the rest three models for model comparisons.