**Additional Tables**

**Table S1**. Candidate models for predicting the probability of mite infestation under the effects of environmental factors and host traits (A total of 6 models’ accumulative Akaike weight ≤ 0.95).

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | logLik | *k* | AIC | ΔAIC | *wi* | Intercept | Year | PC1 | Tmax6 | Sex-m | Body condition |
| 1 | -363.54  | 6 | 739.07  | 0.00  | 0.339  | -2.4108  | + | 0.2022  | 0.1727  | + | — |
| 2 | -364.95  | 5 | 739.91  | 0.83  | 0.224  | -2.3797  | + | 0.2100  | — | + | — |
| 3 | -363.37  | 7 | 740.75  | 1.67  | 0.147  | -2.4293  | + | 0.2098  | 0.1762  | + | 0.0845  |
| 4 | -365.81  | 5 | 741.61  | 2.54  | 0.095  | -2.3780  | + | — | 0.1789  | + | — |
| 5 | -364.85  | 6 | 741.70  | 2.62  | 0.091  | -2.3935  | + | 0.2160  | — | + | 0.0676  |
| 6 | -367.48  | 4 | 742.96  | 3.89  | 0.049  | -2.3471  | + | — | — | + | — |

Abbreviations: AIC = Akaike’s information criterion; logLik = Likelihood; *k* = Number of parameters in the model; *wi* = Model weight; PC1 = The first PCA axis to describe environmental factors; Tmax6 = Mean maximal temperature of June; Year = Capture year; Sex-m = Male sex.

**Table S2**. Candidate models for predicting mite load under the effects of environmental factors and host traits (A total of 20 models’ accumulative Akaike weight ≤ 0.95).

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | logLik | *k* | AICc | ΔAICc | *wi* | Intercept | Year | PC1 | Tmax6 | Sex-m | Body condition |
| 1 | -482.99  | 3 | 280.96  | 0.00  | 0.193  | 1.1603  | — | — | — | + | -0.3354  |
| 2 | -476.93  | 5 | 281.82  | 0.86  | 0.126  | 0.8889  | + | — | — | + | -0.2439  |
| 3 | -482.62  | 4 | 282.88  | 1.92  | 0.074  | 1.1583  | — | 0.0307  | — | + | -0.3200  |
| 4 | -482.95  | 4 | 283.07  | 2.10  | 0.068  | 0.8631  | + | — | — | + | — |
| 5 | -482.97  | 4 | 283.08  | 2.12  | 0.067  | 1.1615  | — | — | -0.0076  | + | -0.3350  |
| 6 | -475.76  | 6 | 283.34  | 2.37  | 0.059  | 0.8452  | + | 0.0579  | — | + | -0.2130  |
| 7 | -479.94  | 5 | 283.52  | 2.56  | 0.054  | 0.7988  | + | 0.0900  | — | + | — |
| 8 | -491.60  | 2 | 283.72  | 2.76  | 0.049  | 1.3273  | — | — | — | — | -0.3194  |
| 9 | -476.87  | 6 | 283.96  | 3.00  | 0.043  | 0.8839  | + | — | 0.0148  | + | -0.2421  |
| 10 | -486.19  | 4 | 284.89  | 3.93  | 0.027  | 1.1088  | + | — | — | — | -0.2289  |
| 11 | -482.60  | 5 | 285.02  | 4.06  | 0.025  | 1.1595  | — | 0.0308  | -0.0083  | + | -0.3194  |
| 12 | -482.73  | 5 | 285.10  | 4.13  | 0.024  | 0.8538  | + | — | 0.0263  | + | — |
| 13 | -490.97  | 3 | 285.47  | 4.50  | 0.020  | 1.3217  | — | 0.0399  | — | — | -0.3001  |
| 14 | -475.70  | 7 | 285.51  | 4.55  | 0.020  | 0.8402  | + | 0.0579  | 0.0145  | + | -0.2114  |
| 15 | -479.79  | 6 | 285.61  | 4.65  | 0.019  | 0.7910  | + | 0.0894  | 0.0225  | + | — |
| 16 | -491.46  | 3 | 285.74  | 4.78  | 0.018  | 1.3285  | — | — | -0.0206  | — | -0.3186  |
| 17 | -491.89  | 3 | 285.99  | 5.03  | 0.016  | 1.0799  | + | — | — | — | — |
| 18 | -496.05  | 2 | 286.24  | 5.27  | 0.014  | 1.2218  | — | — | — | + | — |
| 19 | -485.01  | 5 | 286.38  | 5.42  | 0.013  | 1.0640  | + | 0.0582  | — | — | -0.1996  |
| 20 | -488.98  | 4 | 286.47  | 5.50  | 0.012  | 1.0161  | + | 0.0891  | — | — | — |

Abbreviations: AIC = Akaike’s information criterion; logLik = Likelihood; *k* = Number of parameters in the model; *wi* = Model weight; PC1 = The first PCA axis to describe environmental factors; Tmax6 = Mean maximal temperature of June; Year = Capture year; Sex-m = Male sex.

**Table S3**. Candidate models for predicting the probability of tick infestation under the effects of environmental factors and host traits (A total of 7 models’ accumulative Akaike weight ≤ 0.95).

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | logLik | *k* | AIC | ΔAIC | *wi* | Intercept | Year | PC1 | Tmax6 | Sex-m | Body condition |
| 1 | -314.65  | 6 | 641.31  | 0.00  | 0.245  | -2.3175  | + | -0.5122  | -0.1606  | + | — |
| 2 | -316.23  | 5 | 642.46  | 1.15  | 0.138  | -2.3312  | + | -0.5492  | — | + | — |
| 3 | -316.41  | 5 | 642.81  | 1.50  | 0.116  | -2.1376  | + | -0.5032  | -0.1654  | — | — |
| 4 | -314.55  | 7 | 643.11  | 1.80  | 0.100  | -2.3298  | + | -0.5083  | -0.1586  | + | 0.0667  |
| 5 | -318.07  | 4 | 644.13  | 2.82  | 0.060  | -1.9096  | — | -0.5351  | -0.1814  | + | — |
| 6 | -318.08  | 4 | 644.15  | 2.84  | 0.059  | -2.1464  | + | -0.5413  | — | — | — |
| 7 | -316.09  | 6 | 644.18  | 2.87  | 0.058  | -2.3455  | + | -0.5440  | — | + | 0.0776  |
| 8 | -319.25  | 3 | 644.50  | 3.19  | 0.050  | -1.7918  | — | -0.5245  | -0.1832  | — | — |
| 9 | -316.31  | 6 | 644.63  | 3.32  | 0.047  | -2.1490  | + | -0.4995  | -0.1635  | — | 0.0625  |
| 10 | -319.92  | 3 | 645.84  | 4.53  | 0.025  | -1.9072  | — | -0.5809  | — | + | — |
| 11 | -317.95  | 5 | 645.90  | 4.59  | 0.025  | -2.1596  | + | -0.5363  | — | — | 0.0727  |
| 12 | -318.06  | 5 | 646.12  | 4.81  | 0.022  | -1.9097  | — | -0.5341  | -0.1808  | + | 0.0175  |

Abbreviations: AIC = Akaike’s information criterion; logLik = Likelihood; *k* = Number of parameters in the model; *wi* = Model weight; PC1 = The first PCA axis to describe environmental factors; Tmax6 = Mean maximal temperature of June; Year = Capture year; Sex-m = Male sex.

**Table S4**. Candidate models for predicting tick load under the effects of environmental factors and host traits (A total of 24 models’ accumulative Akaike weight ≤ 0.95).

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | logLik | *k* | AICc | ΔAICc | *wi* | Intercept | Year | PC1 | Tmax6 | Sex-m | Body condition |
| 1 | -224.54  | 3 | 356.15  | 0.00  | 0.170  | 0.9727  | + | — | — | — | — |
| 2 | -228.33  | 1 | 357.78  | 1.63  | 0.075  | 0.8659  | — | — | — | — | — |
| 3 | -224.46  | 4 | 358.20  | 2.04  | 0.061  | 0.9500  | + | — | — | + | — |
| 4 | -224.53  | 4 | 358.31  | 2.16  | 0.058  | 0.9810  | + | 0.0113  | — | — | — |
| 5 | -224.54  | 4 | 358.31  | 2.16  | 0.058  | 0.9728  | + | — | — | — | -0.0133  |
| 6 | -224.54  | 4 | 358.32  | 2.17  | 0.058  | 0.9686  | + | — | -0.0054  | — | — |
| 7 | -227.38  | 2 | 358.41  | 2.26  | 0.055  | 0.8217  | — | -0.0860  | — | — | — |
| 8 | -227.41  | 2 | 358.45  | 2.30  | 0.054  | 0.8459  | — | — | -0.0640  | — | — |
| 9 | -226.23  | 3 | 358.76  | 2.61  | 0.046  | 0.7946  | — | -0.0960  | -0.0708  | — | — |
| 10 | -228.05  | 2 | 359.44  | 3.29  | 0.033  | 0.8300  | — | — | — | + | — |
| 11 | -228.28  | 2 | 359.79  | 3.64  | 0.028  | 0.8672  | — | — | — | — | -0.0369  |
| 12 | -227.07  | 3 | 360.07  | 3.92  | 0.024  | 0.8063  | — | — | -0.0659  | + | — |
| 13 | -227.15  | 3 | 360.19  | 4.04  | 0.023  | 0.7905  | — | -0.0837  | — | + | — |
| 14 | -224.45  | 5 | 360.39  | 4.24  | 0.020  | 0.9424  | + | — | -0.0086  | + | — |
| 15 | -224.45  | 5 | 360.39  | 4.24  | 0.020  | 0.9577  | + | 0.0101  | — | + | — |
| 16 | -224.45  | 5 | 360.40  | 4.25  | 0.020  | 0.9503  | + | — | — | + | -0.0120  |
| 17 | -227.29  | 3 | 360.41  | 4.26  | 0.020  | 0.8227  | — | -0.0876  | — | — | -0.0464  |
| 18 | -227.33  | 3 | 360.47  | 4.32  | 0.020  | 0.8472  | — | — | -0.0648  | — | -0.0421  |
| 19 | -224.53  | 5 | 360.51  | 4.36  | 0.019  | 0.9803  | + | 0.0102  | — | — | -0.0113  |
| 20 | -225.96  | 4 | 360.51  | 4.36  | 0.019  | 0.7601  | — | -0.0937  | -0.0723  | + | — |
| 21 | -224.53  | 5 | 360.52  | 4.37  | 0.019  | 0.9681  | + | — | -0.0063  | — | -0.0146  |
| 22 | -224.53  | 5 | 360.52  | 4.37  | 0.019  | 0.9782  | + | 0.0099  | -0.0024  | — | — |
| 23 | -226.11  | 4 | 360.75  | 4.60  | 0.017  | 0.7952  | — | -0.0980  | -0.0720  | — | -0.0537  |
| 24 | -228.00  | 3 | 361.50  | 5.35  | 0.012  | 0.8318  | — | — | — | + | -0.0345  |

Abbreviations: AIC = Akaike’s information criterion; logLik = Likelihood; *k* = Number of parameters in the model; *wi* = Model weight; PC1 = The first PCA axis to describe environmental factors; Tmax6 = Mean maximal temperature of June; Year = Capture year; Sex-m = Male sex.

**Table S5**. Candidate models for predicting probability of tick infestation under the effects of probability of mite infestation (MP) and environmental factors (A total of 7 models’ accumulative Akaike weight ≤ 0.95).

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | logLik | *k* | AIC | ΔAIC | *wi* | Intercept | MP | PC1 | Tmax6 | MP × PC1 | MP × Tmax6 |
| 1 | -221.81  | 5 | 453.70  | 0.00  | 0.503  | -2.5634  | -0.1158  | -0.1990  | — | -0.8955  | — |
| 2 | -221.73  | 6 | 455.56  | 1.86  | 0.198  | -2.5587  | -0.1179  | -0.2129  | 0.1881  | -0.8969  | — |
| 3 | -221.32  | 7 | 456.78  | 3.07  | 0.108  | -2.5518  | -0.1361  | -0.2340  | 0.1209  | -0.8293  | 0.2100  |
| 4 | -227.06  | 2 | 458.15  | 4.44  | 0.055  | -2.5235  | — | — | — | — | — |
| 5 | -226.72  | 3 | 459.48  | 5.78  | 0.028  | -2.5688  | — | -0.4388  | — | — | — |
| 6 | -226.82  | 3 | 459.67  | 5.97  | 0.025  | -2.5707  | 0.2114  | — | — | — | — |
| 7 | -226.99  | 3 | 460.01  | 6.31  | 0.021  | -2.5193  | — | — | 0.1846  | — | — |

Abbreviations: AIC = Akaike’s information criterion; logLik = Likelihood; *k* = Number of parameters in the model; *wi* = Model weight; PC1 = The first PCA axis to describe environmental factors; MP = Mite infestation probability; Tmax6 = Mean maximal temperature of June.

**Table S6**. Candidate models for predicting tick load under the effects of mite load (ML) and environmental factors (A total of 2 models’ accumulative Akaike weight ≤ 0.95).

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | logLik | *k* | AIC | ΔAIC | *wi* | Intercept | ML | PC1 | Tmax6 | ML ×PC1 | ML × Tmax6 |
| 1 | -317.71  | 6 | 647.76  | 0.00  | 0.624  | -0.5323  | -0.2322  | -0.0690  | — | -0.1650  | — |
| 2 | -317.51  | 7 | 649.48  | 1.71  | 0.265  | -0.5271  | -0.2341  | -0.0695  | 0.1441  | -0.1663  | — |

Abbreviations: AIC = Akaike’s information criterion; logLik = Likelihood; *k* = Number of parameters in the model; *wi* = Model weight; PC1 = The first PCA axis to describe environmental factors; ML = Mite load; Tmax6 = Mean maximal temperature of June.