*Animal Biology*

# Should I stay or should I go: Escape behaviour of Russell's vipers, *Daboia russelii* (Shaw & Nodder, 1797) in India's agricultural landscapes

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## Supplementary material

**Table S1.**

Definitions used to categorise behaviour and microhabitat usage in Russell's vipers *Daboia russelii*.

| | **Definition** |
|---|---|
| **Behaviours** | |
| Ambush | Body bunched up, ready to spring, lower jaw usually touching the ground and often in front of the body |
| Basking | The snake is exposed to sun in a location where it is clearly gaining heat from the sun. Body not in tight coils |
| Courtship | When the snake is with an individual of the opposite sex during mating season(October, November, December) |
| Resting | Coiled up, usually not exposed to the sun, head placed within the coils |
| Unknown | Behaviour of the snake cannot be determined |
| **Microhabitat** | |
| Burrow | Hole with tunnel, dug by other animals or termite mounds |
| Large fallen leaves | Banana leaves, coconut fronds or other palm fronds fallen on the ground or artificially piled up with no sign of decomposition |
| Low vegetation | Wild or cultivated vegetation up to 0.5 m in height |
| High vegetation | Wild or cultivated vegetation above 0.5 m in heigh |
| Material piles | Rocks, building material, roofing sheets, etc. piled up. Does not include natural rock formations |
| Fire wood | Branches or wood that has been cut into pieces and piled |

**Table S2.**

Summary and comparison of different models from the generalised linear model (GLM) and generalised linear mixed-effects model (GLMM) analyses evaluating escape response and flight initiation distance (FID) in Russell's vipers. Models in bold indicate the best-fit model with the lowest Akaike Information Criterion (AIC) values.

| Model | | | AIC | AICc | ΔAICc | Akaike weights |
|---|---|---|---|---|---|---|
| **Dependent variable** | **Fixed effects** | **Random effects** | | | | |
| **Russell's viper escape response (binomial with logit link function)** | | | | | | |
| **Moved away** | **Behaviour*** | **Individual ID + date** | **208.1588** | **208.2286** | **0** | **0.5494** |
| Moved away | Behaviour* + snake's visibility + relative humidity | Individual ID + date | 210.1726 | 210.2432 | 2.0146 | 0.2006 |
| Moved away | Behaviour* + snake's visibility + tracker distance + relative humidity | Individual ID + date | 211.4659 | 211.5365 | 3.3079 | 0.1050 |
| Moved away | Behaviour* + snake's visibility | Individual ID + date | 212.2344 | 212.3042 | 4.0756 | 0.0715 |
| Moved away | Behaviour* + snake's visibility + tracker distance + relative humidity + distance to cover | Individual ID + date | 213.1094 | 213.1800 | 4.9514 | 0.0462 |
| Moved away | Behaviour* + snake's visibility + tracker distance + relative humidity + distance to cover + sex | Individual ID + date | 214.8986 | 214.9692 | 6.7406 | 0.0188 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Moved away | Behaviour* + snake's visibility + tracker distance + relative humidity + distance to cover + sex + ambient temperature | Individual ID + date | 216.8565 | 216.8565 | 8.6985 | 0.0070 |
| Moved away | Behaviour* + snake's visibility + tracker distance + relative humidity + distance to cover + sex + ambient temperature + microhabitat | Individual ID + date | 221.3916 | 221.3916 | 13.2336 | 0.0007 |
| Moved away | null | Individual ID + date | 223.0779 | 223.1477 | 14.9191 | 0.0003 |
| **Effect of body temperature on escape response (binomial with logit link function)** | | | | | | |
| **Moved away** | **Body temperature** | **Individual ID + date** | **182.2546** | **182.3435** | **0** | **0.8126** |
| Moved away | Null | Individual ID + Date | 185.1894 | 185.2783 | 2.9348 | 0.1873 |
| **Russell's viper flight initiation distance (FID) (gamma with log link function)** | | | | | | |
| **FID** | **Snake's visibility + distance to cover*** | **Individual ID + date** | **188.4827** | **188.6618** | **0** | **0.4489** |
| FID | Snake's visibility + sex + distance to cover* + | Individual ID + date | 189.4846 | 189.6637 | 1.001 | 0.2720 |
| FID | Snake's visibility + sex + distance to cover* + body temperature | Individual ID + date | 191.2061 | 191.3852 | 2.7234 | 0.1150 |

| | | | | | | |
|---|---|---|---|---|---|---|
| FID | Snake's visibility* + sex + behaviour + distance to cover* + body temperature | Individual ID + date | 191.2828 | 191.4619 | 2.8001 | 0.1106 |
| FID | Distance to cover* | Individual ID + date | 193.1908 | 193.3700 | 4.7082 | 0.0426 |
| FID | Null | Individual ID + date | 196.9559 | 197.1350 | 8.4732 | 0.0064 |
| FID | Snake's visibility + sex + behaviour + microhabitat + distance to cover* + body temperature | Individual ID + date | 197.8037 | 197.9828 | 9.3210 | 0.0042 |

**Table S3.**

Results of the pairwise comparison evaluating escape response across behaviours (A, Ambush; B, basking; C, courtship; R, resting) and flight initiation distance (FID) across snake's visibility (NV, not visible; SC, small coils visible; under half visible; UH, MH, more than half visible; CP, completely visible) using Tukey's *post-hoc* test. Models in bold indicate the significant pair-wise combinations.

| Pair of groups | Estimate | Std. error | z value | *P* value |
|---|---|---|---|---|
| **Escape response across behaviours** | | | | |
| B–A | 1.6851 | 0.7375 | 2.285 | 0.0903 |
| C–A | 2.9369 | 1.4034 | 2.093 | 0.1403 |
| R–A | 0.1886 | 0.8013 | 0.235 | 0.9949 |
| C–B | 1.2518 | 1.2664 | 0.989 | 0.7378 |
| **R–B** | **−1.4965** | **0.4930** | **−3.035** | **0.0112** |
| R–C | −2.7484 | 1.3336 | −2.061 | 0.1503 |
| **FID across different levels of the snake's visibility** | | | | |
| MH–CP | 0.47350 | 0.29022 | 1.632 | 0.4708 |
| NV–CP | −0.37074 | 0.26544 | −1.397 | 0.6238 |
| SC–CP | −0.02365 | 0.27019 | −0.088 | 1.0000 |
| UH–CP | 0.28868 | 0.28244 | 1.022 | 0.8417 |
| **NV–MH** | **−0.84424** | **0.26090** | **−3.236** | **0.0104** |
| SC–MH | −0.49715 | 0.23374 | −2.127 | 0.2047 |
| UH–MH | −0.18482 | 0.23001 | −0.804 | 0.9278 |
| SC–NV | 0.34709 | 0.20483 | 1.695 | 0.4310 |
| **UH–NV** | **0.65942** | **0.21570** | **3.057** | **0.0184** |
| UH–SC | 0.31233 | 0.21131 | 1.478 | 0.5705 |