**Supplementary Material 2.** **Bioclimatic variables and best model selection**. Bioclimatic variables used= Represent the bioclimatic variables that do not have a correlation value >0.9 in the selected *M* (geographic area to project the ecological niche modeling) for each species. Best model features= Features of the selected model that have lower AICc values, greater AUC values and less number of features. L= Allow linear features to be used, Q= Allow quadratic features to be used, H= Allow hinge features to be used, P= Allow product features to be used. Best model RM= Best model regularization multiplier. The greater the number the more spread out distribution. Full AUC= The AUC value obtained by creating the model with all data as training data.

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| **Taxon** | **Bioclimatic variables** | **Best model features** | **Best model RM** | **Full AUC** |
| *Centuroides baergi* | 1,2,3,4,5,7,12,14,15,18 | LQ | 1 | 0.96 |
| *Centuroides balasenesis* | 1,2,3,4,7,12,14,15,18,19 | LH | 3.5 | 0.83 |
| *Centuroides gracilis* | 1,2,3,4,7,12,14,18 | L | 1 | 0.88 |
| *Centuroides limipidus* | 1,2,3,4,5,7,12,14,15,18 | L | 3.5 | 0.76 |
| *Centuroides ornatus* | 1,2,3,4,5,6,7,8,9,12,14,15,18,19 | LQP | 4 | 0.88 |
| *Chihuahuanus bilineatus* | 1,2,3,4,5,6,7,9,12, 14, 15, 18, 19 | LQP | 1 | 0.95 |
| *Chihuahuanus crassimanus* | 1,2,3,6,7,8,9,10,12,14,18, 19 | L | 2.5 | 0.80 |
| *Chihuahuanus glabrimanus* | 1,2,3,4,5,7,12,14,15,17,18 | L | 3.5 | 0.94 |
| *Diplocentrus reddelli* | 1,2,3,4,7,12,14,15,18,19 | LQ | 2.5 | 0.67 |
| *Diplocentrus zacatecanus* | 1,2,3,4,5,6,7,12,14,15,18,19 | LH | 3.5 | 0.81 |
| *Hadrurus concolorus* | 1,2,3,4,5,6,8,9,12,14,15,19 | LQP | 2 | 0.86 |
| *Kochius sonorae* | 1,2,4,5,6,8,9,12,14,15,18,19 | LQ | 4 | 0.97 |
| *Megacormus grubbsi* | 1,2,3,4,5,7,12,14,15,18 | LH | 2.5 | 0.88 |
| *Mesomexovis oaxaca* | 1,2,3,4, 7,12,14,15,18 | LQP | 1 | 0.97 |
| *Mesomexovis occidentalis* | 1,2,3,4,5,7,12,17,15,18 | L | 1.5 | 0.99 |
| *Mesomexovis subscritatus* | 1,2,3,4,5,7,12,17,15,18 | LQH | 4 | 0.98 |
| *Mesomexovis variegatus* | 1,2,3,4,5,7,12,15,17,18 | L | 1.5 | 0.91 |
| *Paravaejovis spinigerus* | 1,2,3,4,5,6,7,8,9,12,14,15,18,19 | LQP | 2 | 0.98 |
| *Superstitionia donesis* | 1,2,3,4,5,6,8,9,12,14,15,19 | LQP | 1.5 | 0.96 |
| *Thorellius cristimanus* | 1,2,3,4,5,7,12,14,15,18 | L | 3.5 | 0.95 |
| *Thorellius intrepidus* | 1,2,3,4,5,7,12,14,15,18 | L | 3 | 0.93 |
| *Vaejovis granulatus* | 1,2,3,4,5,7,12,14,15,18 | L | 3 | 0.93 |
| *Vaejovis rossmanni* | 1,2,3,5,6,7,9,12,18,15,17,18 | L | 2.5 | 0.89 |
| *Vaejovis smithi* | 1,2,3,4,5,7,12,14,15,18,19 | L | 2.5 | 0.89 |