

A BIOGEOGRAPHICAL ANALYSIS OF THE CHIHUAHUAN DESERT THROUGH ITS HERPETOFAUNA

by

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mesquite-grassland fauna as an ecotone may be summarized. This assemblage has higher simple species diversity than any other, by thirty percent minimally. It is devoid of ecological endemics, except for a single hybrid clonal form, tending to affirm its unstable composition. Furthermore, its affinities, as measured by C.C., indicate almost fifty percent species shared when combined with either adjacent association. Refer to the Vegetation account for additional purely botanical documentation.

A fourth general observation, based on this last table, is that no set of association based faunas share more than thirty-six percent of their species, excepting only the mesquite-grassland ecotone.

S.C. values indicate a simpler dendrogram of relationships, Figure 4, with arid adapted chaparral, desert, and grassland in one cluster and mesic woodland and forest in the other. In this arrangement riparian woodland is somewhat intermediate, but linked more closely to the arid group.

Habitat Displacement or Restriction

This section of the ecological account attempts to organize non-desert relict species of amphibians and reptiles into major units. Each unit provides a hypothetical model based on the distribution and ecology of the relict species. These models, Figure 5, attempt to assign geographical origins outside of the desert and link them to currently utilized refugia within the desert.

The purpose of this complex categorization is to develop a systematic picture of relict distribution patterns. Hopefully, a clarification of relict patterns will help resolve the characteristic desert herpetofauna from the remaining species. It will also provide a defined foundation for subsequent biogeographical discussions.

1. From Great Plain Grassland and Austro-Riparian Woodland to Chihuahuan Desert Lowlands: (Siliceous and Gypsum) Dune and Ephemeral Mesic Edaphic Associations (see Figure 5):

COMMENT: In some cases (i.e., *Ambystoma tigrinum*, *Heterodon nasicus*, and *Sistrurus catenatus*) there may simply be an "in situ" restriction of pluvial and riparian forms in the desiccating barrials of the desert valleys.

In other cases active displacement by competitive exclusion with better adapted desert scrubland forms is probably in effect. *Holbrookia maculata* may be displaced (to dunes and grassland) from open scrub desert by *Cophosaurus texana*. Also grassland species may be superior in locomotion in the soft shifting substrates of dunes and grassland, and thus survive there.

Examples:

Amphibia:

Caudata:

Salientia:

1. *Ambystoma tigrinum*
1. *Scaphiopus bombifrons*
2. *Bufo valliceps*
3. *Bufo woodhousei*
4. *Gastrophryne olivacea*

COMMENT: Many of these forms (i.e., *Syrrhophus marnocki* and *Xantusia arizonae*) are obligatory saxicolous forms that simply survive "in situ" in rocky outcroppings which have been claimed geographically be expanding post-pluvial desert. Other component species, such as *Urosaurus ornatus* may have shifted (in part) to rocky perches and refuges in the absence of woodland.

Examples:

| | |
|-------------|-------------------------------------|
| Amphibia: | |
| Salientia: | 1. <i>Eleutherodactylus augusti</i> |
| | 2. <i>Syrrhophus marnocki</i> |
| Reptilia: | |
| Squamata: | |
| Lacertilia: | 1. <i>Eumeces brevilineatus</i> |
| | 2. <i>Sceloporus jarrovi</i> |
| | 3. <i>Urosaurus ornatus</i> |
| Serpentes: | 1. <i>Lampropeltis mexicana</i> |
| | 2. <i>Tantilla rubra</i> |
| | 3. <i>Tantilla wilcoxi</i> |
| | 4. <i>Crotalus lepidus</i> |
| | 5. <i>Crotalus molossus</i> |

4. From Tamaulipan Mesquite-Grassland to Riparian Woodland and Marsh:

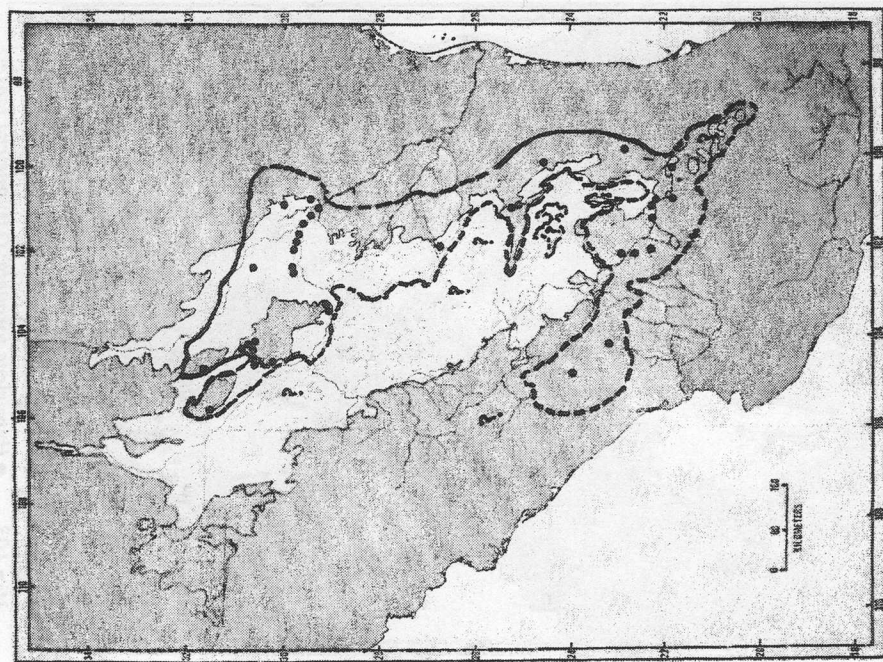
COMMENT: This category overlaps with Group 3b. Subjective decisions made here consider total distribution of the species and its general habitat associations. In borderline cases highly aquatic forms (i.e., *Thamnophis proximus*) have been assigned to Austro-riparian woodland.

Examples:

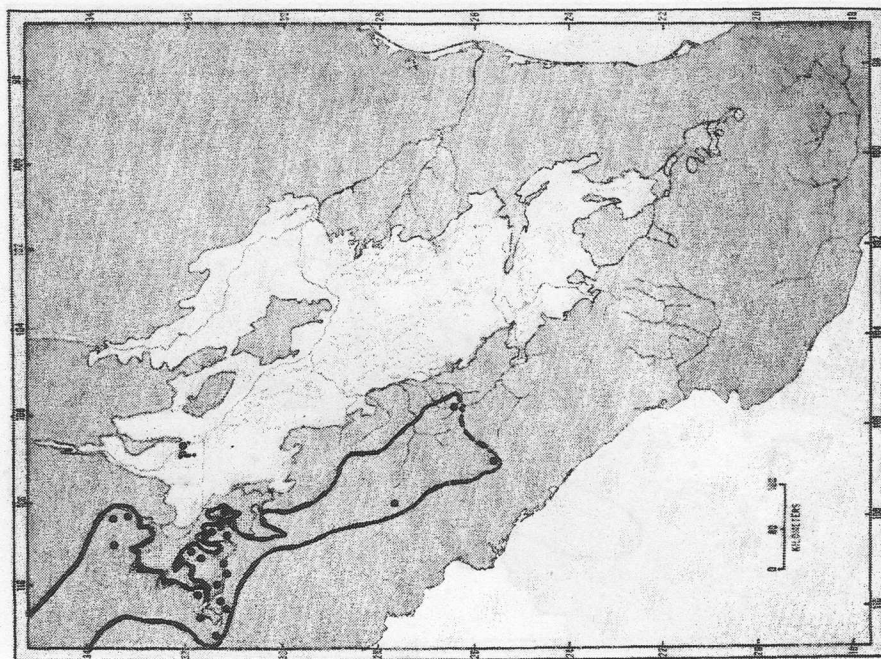
| | |
|--------------|--|
| Amphibia: | |
| Salientia: | 1. <i>Eleutherodactylus augusti</i> (saxicolous-Sierra Madre foothill) |
| | 2. <i>Bufo marinus</i> |
| Reptilia: | |
| Testudinata: | 1. <i>Gopherus berlandieri</i> |
| Squamata: | |
| Lacertilia: | 1. <i>Crotaphytus reticulatus</i> |
| | 2. <i>Sceloporus couchi</i> (?) |
| | 3. <i>Sceloporus olivaceus</i> |
| | 4. <i>Eumeces tetragrammus</i> |
| | 5. <i>Leiolopisma silvicolum</i> |
| Serpentes: | 1. <i>Drymarchon corais</i> |
| | 2. <i>Drymobius margaritiferus</i> |
| | 3. <i>Lampropeltis triangulum</i> |
| | 4. <i>Micrurus fulvius</i> |

5. From Neotropical Woodland to Saxicolous (Karst and Basaltic) Edaphic Associations:

COMMENT: This category overlaps with 3c and b. Only a very few tropical woodland species actually occur as relict faunas in the Chihuahuan Desert proper, though a more considerable number inhabit southern relict pockets (for Queretero, see DIXON, KETSCHERSID & LIEB, 1972). However, the amphibian genera *Eleutherodactylus*, *Syrrhophus*, and the reptilian *Coleonyx* and *Leptotyphlops*



Map 105. *Lampropeltis mexicana*.



Map 106. *Lampropeltis pyromelana*.