BUTTERFLIES FROM COAHUILA, MEXICO

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Dr. C. J. McCoy is Assistant Curator of Amphibians and Reptiles at Carnegie Museum. In June, 1966, accompanied by Mr. Arthur Bianculli, he made a trip¹ to central Coahuila to collect and study these animals. Dr. McCoy also maintains a considerable interest in butterflies and, as his regular work permitted, made a collection of them in the area. Because almost nothing is known about Coahuilan butterflies, a list of his captures should be useful.

The collection was made in three different localities, all in the vicinity of Cuatro Ciénegas de Carranza (about 70 airline km west of Monclova), central Coahuila, Mexico. A sketch map of the area, additional description and some landscape photographs may be found in Taylor (1966). Muller (1947) gives a general description and map of the regional vegetation, also accompanied by photographs.

The three localities are as follows, bracketed portions not being repeated in the species list below:

1. Rio Cañon [ca. 1000 m., 3 mi N Cuatro Ciénegas]

Collecting was done along the river, a spring-fed permanent stream in a deep, narrow canyon with precipitous walls up to 500 feet high. The narrow part is about five miles long and opens at either end onto broad desert basins. Vegetation in the canyon consists of bunch grasses with scattered willows and narrow-leaf cottonwoods along the river, and thickets of mesquite and acacia on higher ground. In side canyons there are hackberry trees and some oaks. Most of the smaller butterflies were taken at the flowers of a low Verbenaceous plant (*Phyla lanceolata*). Lower Sonoran zone: Chihuahuan Desert Scrub (Muller, 1947).

The butterflies here (31 species taken, three others seen) are typical of the Lower Sonoran facies of the Chihuahuan Desert fauna, which extends with little variation over much of the lower elevations on the northern Mexican Plateau and into western Texas, southern New Mexico and southeastern Arizona. With progressive depletion it also occurs in arid and semi-arid Upper Sonoran regions of the southern Plateau and also well into the prairie regions of central United States, and in very dilute form even into eastern United States.

A striking feature of this fauna is the large proportion of known or probable wanderers (species that migrate regularly, whether or not they do so *en masse*): *K. lyside* and *castalia*, *E. nicippe* and *lisa*, *P. protodice*,

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D. gilippus, A. vanillae, E. claudia, V. atalanta, Libytheana sp., H. isola, L. marina, B. exilis, H. phyleus. These total 14 species, or about 41% of all species taken or seen. In addition to their regular and often long migrations, these wanderers share (a) broad environmental tolerance, both to temperatures and to vegetation type; (b) generally high levels of abundance, some of them inclined to frequent eruptions; (c) broad choice of larval food plant species; and (d) frequent occurrence in disturbed environments. The combination is conspicuously one of opportunistic species, capable of rapidly exploiting a region where conditions are stringent and suitable environments few, widely scattered, and often transient.

It is worth noting that there is no trace of regional endemism in this fauna, such as occurs in some degree in the reptiles, and to a truly remarkable degree in the fresh water fish and especially the fresh water mollusks (Taylor, 1966).

2. Rio Salado [de los Nadadores, 7.3 mi W Sacramento, 650 m.]

The area is extensively farmed, part of a large desert basin. Collecting was done along the man-made channel of the river and along the edges of fallow, weed-grown fields. Hedgerows of fig and pomegranate were present, and scattered cottonwoods along the river. Most of the butterflies were taken from the yellow-and-pink flowers of *Cryptantha*. The locality appears to be in the Subtropical zone: Tamaulipan Thorn Scrub (Muller, 1947).

Twelve species were taken here, and two others seen. Despite more intensive and prolonged collecting, five of these 14 were not found at Rio Cañon: *P. sennae*, *P. tharos*, *B. hyperia*, *M. amymone*, *S. columella*. In this latitude, all of these are regional residents of the Subtropical zone. *P. tharos* ranges far into cooler zones in eastern United States, but not locally. *P. sennae* and *M. amymone* are wanderers, but do not appear to reside anywhere in cooler zones, though they may sometimes occur as transients. *B. hyperia* and *S. columella* are both regionally confined to the Subtropical zone. *S. columella* especially is a good zonal indicator regionally: it is fairly common, multiple brooded, tolerates arid and semi-arid conditions, and is not known to wander at all. On the basis of these species, particularly *columella*, I conclude that this locality lies in the Subtropical zone, but probably near its boundary with the Lower Sonoran.

3. El Capriño [2.4 mi E Sacramento, 550 m.]

A few butterflies were collected at weeds along the roadside, in mesquite grassland. The land is open, rocky, hilly, grazed by goats but not farmed. Probably Subtropical zone. The Rio Cañon is only about 16 airline miles from the Rio Salado locality. Nonetheless, Muller (1947) shows that they are in different vegetation zones and the butterflies, as described above, indicate different life zones. Dr. McCoy tells me that there is also a striking difference in the herpetofaunas of the two localities. This difference in the localities is explained in part by elevation (Rio Cañon is about 350 meters—1,100 feet—higher than Rio Salado), and in part by the westward decrease in precipitation. The Rio Cañon is itself a wellwatered locality, so the latter effect may be less important to the butterflies than the former.

Species List

Papilio polyxenes asterius Cramer

Rio Cañon 9–12.VI (3∂ 2♀)

Nathalis iole Boisduval

Rio Cañon 10–19.VI (7 ♂ 11 ♀); Rio Salado 30.VI (2 ♂)

Kricogonia lyside (Godart)

Rio Cañon 9–19.VI (5♀)

This is a known migrant and probably is non-resident.

Kricogonia castalia (Fabricius)

Rio Cañon 9-26.VI (88: 2, no apical hind wing black bar;

1, very thin bar; 5, normal bar); Rio Salado 30.VI (18, no bar).

I am not convinced of the distinctness of this and the preceding species, but follow Comstock (1944: 515) in discriminating them. Like the preceding, *castalia* is a renowned migrant, probably nonresident at the Rio Cañon at least.

Eurema mexicana (Boisduval) Rio Cañon 18.VI (13) Eurema nicippe (Cramer) Rio Cañon 10-22.VI (4 8 2 9) Eurema lisa lisa Boisduval & LeConte Rio Cañon 26.VI (13) Eurema nise (Cramer) Rio Cañon 18.VI (13) This may be a stray from the Subtropical zone. Phoebis sennae (Linnaeus) Rio Salado (seen, not taken) Pieris protodice (Linnaeus) Rio Cañon 8-18.VI (3 & 9 ♀); Rio Salado 30.VI (2 & 2 ♀) Danaus gilippus strigosus (Bates) Rio Cañon 9-19.VI (23 29) Agraulis vanillae incarnata (Riley) Rio Cañon 9.VI (13) Euptoieta claudia (Cramer) Rio Cañon 9.VI (19 ?) A pair in copula (10:30 A.M., & flying) was also taken in Nuevo Leon: 6 mi S Villa de Garcia (25° 49' N, 100° 35' W), 770 m., 2.VII. Chlosyne lacinia adjutrix Scudder Rio Cañon 10-19.VI (13 59); Rio Salado 30.VI (13 19); El Capriño 23.VI (28 19) To judge by the condition of the specimens, a brood was just coming to

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an end in late June, represented almost entirely by badly worn females. At the same time a new brood was beginning to appear, represented chiefly by fresh males. *Phyciodes vesta* (Edwards) Rio Cañon 16–18.VI (2♀); Rio Salado 30.VI (3♂ 1♀) Phyciodes thatos (Drury) Rio Salado 30.VI (19) Phyciodes phaon (Edwards) Rio Cañon 9–26.VI ($10 \& 7 \Im$); Rio Salado 30.VI (4 &); El Capriño 23.VI (23 19) Phyciodes (Tritanassa) texana texana (Edwards) Rio Cañon 10.VI (19) Nymphalis antiopa (Linnaeus) Rio Cañon (seen, not taken) Vanessa atalanta (Linnaeus) Rio Cañon (seen, not taken) Mestra amymone (Ménétriés) Rio Salado 30.VI (19 ?) Biblis hyperia (Cramer) Rio Salado (seen, not taken) Asterocampa leila (Edwards), subspecies Rio Cañon 9-19.VI (93 59) Anaea aidea (Guérin-Méneville) Rio Cañon 18.VI (19) A female was also taken in Nuevo Leon: 6 mi S Villa de Garcia (25° 49' N, 100° 35' W), 770 m., 2.VII. Libytheana carinenta mexicana Michener Rio Cañon (a Libytheana, probably this, seen but not taken); Rio Salado 30.VI (1) I am not certain that this entity is really distinct from L. bachmanii larvata (Strecker). It is a well known migrant and perhaps not resident. Calephelis species Rio Cañon 15 specimens These will be determined by Mr. W. S. McAlpine. Strymon melinus franki Field Rio Cañon 10-26.VI (2 ♂ 19 ♀); Rio Salado 30.VI (1 ♂ 4 ♀) Dr. McCov tells me that when he arrived in the area (Rio Cañon) in early June there were no melinus at all, but that they became common towards the end of the month. Curiously, however, the few early specimens are all rather fresh, the late ones much worn. Perhaps these latter are immigrated, rather than newly emerged, specimens. Strumon columella istapa (Reakirt) Rio Salado 30.VI (13 19) Hemiargus (Echinargus) isola alce (Edwards) Rio Cañon 9-25.VI (123 69) Leptotes marina (Reakirt) Rio Cañon 9-18.VI (23); El Capriño 23.VI (13) Brephidium exilis exilis (Boisduval) Rio Cañon 9–18.VI (6349)

Systasea evansi (Bell)

Rio Cañon 9-19.VI (2)

Pyrgus oileus philetas Edwards

Rio Cañon 9-10.VI (13 29)

Pyrgus sp. (group of P. communis (Grote)) Rio Cañon 12-19.VI (4329); Rio Salado 30.VI (29) Pholisora catullus (Fabricius) Rio Cañon 10.VI (1) Ancyloxypha arene (Edwards) Rio Cañon 16-18.VI (18 19) Copaeodes aurantiaca (Hewitson) Rio Cañon 18-26.VI (6) Hylephila phyleus (Drury) Rio Cañon 10.VI $(13\ 19)$ Amblyscirtes nysa Edwards Rio Cañon 26.VI (19)

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CONTINUOUS VARIATION IN RELATED SPECIES OF THE GENUS CATOCALA (NOCTUIDAE)

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The genus *Catocala* has been extensively studied for more than a century. In fact, at the turn of the century, American journals dealing with the Lepidoptera sometimes devoted the bulk of their coverage to this genus. Even with all this attention many taxonomic problems remain. These problems have defied classical morphological techniques, perhaps because they centered around characters differing in kind rather than amount. This study is, in the main, descriptive of the variation existing in several frequently used diagnostic characters. However, the species used in the examples were selected to suggest the utility of these statistical descriptions in taxonomic studies. They may supplement a knowledge of classical morphology and ecology.

METHODS

An unselected sample of over 1500 Catocala of 30 species was taken during the summer of 1961 at a Mercury vapor light operated on the edge of a deciduous wood at the University of Michigan, Edwin S. George