

BUTTERFLY MIGRATIONS IN SOUTHEASTERN MÉXICO DURING 1963 AND 1964

The rain season should normally begin in the northern portion of the peninsula of Yucatán in late May or early June. In 1963, normal rains did not begin until early August. During June and July, the prevailing dry, hot, southeast wind, which is characteristic of the dry season from January or February to May, persisted. Insects of all orders were greatly affected, especially the Lepidoptera.

About June 8, 9, and 10, however, torrencial rains fell in Campeche, Quintana Roo, and in the hilly Puuc region of southern Yucatán. Northern Yucatán experienced only slight drizzle. This precipitation was caused by a temporary shifting of the wind from the southeast to east. The latter are the normal wet-season winds.

On June 11, there suddenly appeared in Mérida, Yucatán, a large migration of *Kricogonia castalia lyside* Godart. Individuals were flying in very large numbers, at about tree- and roof-top height and higher in the city, travelling from west-southwest to slightly north of east. This migration ceased at night, and continued through the morning of June 14. During the afternoon of that day, a rainstorm from the east occurred, after which the species in mind began flying from north to south, still in great numbers. On June 15, the migration's direction changed from west-southwest to slightly north of east, as in the beginning, however now in much lesser numbers. During the heaviest parts of the migration, approximately 1000 individuals passed per 100 feet of housetops per minute. On June 16, I had to leave the city on a four day trip to northern Quintana Roo and noticed that no *K. c. lyside* were migrating in central or eastern Yucatán nor in Quintana Roo itself, not even at a distance of 30 kilometers east of Mérida. On returning home on June 20, I only saw small numbers of the species flying, along with *Libytheana carinenta* Cramer on the outskirts of Mérida, going from west to east. During the afternoon of that day many were seen resting on dryish thorn trees. Apparently the migration had stopped.

On July 9, in Mérida, with the rains still lacking over most of Yucatán, *Eunica monima* Cramer, *Agraulis vanillae* Linn., and a few other odds and ends accompanied *K. c. lyside* in a much shorter migration from north-northwest to slightly south of southeast, with fair numbers of individuals involved, but certainly not as great as the aforementioned migration of the latter species. The winds at this time were still hot and dry from the southeast, more typical of the dry season than for the month of July.

Near San Antonio (now called Cárdenas), Tabasco, a migration of *Calpodus ethlius* (Stoll) (determined by Lee D. Miller, University of

Pittsburgh) was observed from three to four o'clock in the afternoon of March 8, 1964, in a large grassy swamp. The flight was heavy, calculated at about 500 individuals crossing per 100 feet of highway per minute. These expert fliers were wary and hard to catch, as in half an hour I managed to collect only five specimens, besides another I picked up that was hit by a car. At first they flew directly from north to south, but curiously and slowly changed from west to east, finally changing to southwest to northeast. This changing of direction on the vast, open, flat, swampy lowland in only an hour's time doesn't make much sense. It might be surmized that they were only flying circles within the particular swamp where I observed them. It might be mentioned that the southern end of the swamp was south of the road and very close to the same, and was rounded as if the road were a line cut through the middle of a circle, being surrounded by swamp forest. However north of the road the swamps extended as far as the eye could see. Perhaps these creatures, on reaching the southern end of the swamp and encountering the forest, circled back to stay within the limits of the more open grassy areas. The winds on that afternoon were mild and hot from the southeast.

Lee D. Miller calls my attention to an article published by C. B. Williams (Records of Insect Migration in Tropical America, 1920, *Trans. Ent. Soc. LONDON*, 68:154-159), in which excellent detail is given on migratory habits of *Calpododes ethlius* in Panama. In this article it will be noticed that this species in migration does not adhere to one single direction, mention being made of it "passing in almost every direction" in the course of a single afternoon and evening.

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HUMIDITY, DARKNESS, AND GOLD SPOTS AS POSSIBLE FACTORS IN PUPAL DURATION OF MONARCH BUTTERFLIES

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In his recent book on the monarch butterfly, *Danaus plexippus* (L.), Dr. F. A. Urquhart (1961: 38-39) encouraged work on the pupal stage with these statements: "I am of the opinion that these spots are not purely ornamental, but that they perform a definite function. They may act as light receptors that delay emergence of the adult butterfly during periods of adverse weather conditions.", and "Presumably some light perception mechanism controls the rate of development, allowing more rapid development on bright, sunny days, and virtually no development during periods of darkness." Accordingly, the following two experiments were conducted.