

## LARVAL FOOD PLANTS FOR FIVE TEXAS HESPERIIDAE

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This paper will record for the first time local larval food plants for *Vidius perigenes* Godman, *Erynnis juvenalis juvenalis* (Fabricius), *Cogia calchas* (Herrich-Schäffer), and *Urbanus procne* (Plötz). Although local larval food plants have been previously recorded for *Chioides catillus albofasciatus* (Hewitson), additional rearing data are given here in support of a larval diapause for the species. Arrangement for the skippers follows dos Passos (1964).

Of the larval food plants given, perhaps the most significant is the one for *Urbanus procne*. Burns (1964, p. 148) represented all contemporary lepidopterists when he wrote: "the larvae of pyrgine skippers are known to eat only dicotyledons." We must now change our thinking on this matter because the larvae of *U. procne* do eat grass, a monocotyledon. No doubt other members of this genus will be found to feed on grasses in the larval stage.

The larval food plants given in this paper are here summarized and arranged alphabetically by plant family and genus:

| Plant Family | Plant Species                  | Lepidoptera                      |
|--------------|--------------------------------|----------------------------------|
| Fagaceae     | <i>Quercus fusiformis</i>      | <i>Erynnis j. juvenalis</i>      |
|              | <i>Quercus stellata</i>        | <i>Erynnis j. juvenalis</i>      |
|              | <i>Quercus marilandica</i>     | <i>Erynnis j. juvenalis</i>      |
| Graminaeae   | <i>Cynodon dactylon</i>        | <i>Urbanus procne</i>            |
|              | <i>Stenotaphrum secundatum</i> | <i>Vidius perigenes</i>          |
| Leguminosae  | <i>Mimosa berlandieri</i>      | <i>Cogia calchas</i>             |
|              | <i>Rhynchosia minima</i>       | <i>Chioides c. albofasciatus</i> |

*Vidius perigenes* Godman

Tilden (1964) recorded this species for the first time north of the Rio Grande River. At present its distribution in the United States north of Mexico is limited to Cameron County, Texas, where it is well established. Its principal habitat appears to be grassy areas in mesquite flats (*Prosopis glandulosa* Torr.) along the south Texas plains. Three broods with some overlapping are indicated. The writer has collected it in March, April, and October; reared imagines emerged in June. Exact dates and localities follow.

Cameron County, 21 April 1962. At the Laguna Atascosa National Wildlife Refuge, two males and one female were collected. The latter was kept for oviposition. It was confined in a small glass jar with St. Augustine grass, *Stenotaphrum secundatum* (Walt.) Kuntze. Six eggs were deposited the following day on the grass, after which the female died, probably due to overheating. The eggs hatched within a few days and the first-instar larvae accepted *S. secundatum* reluctantly. Three larvae pupated;

1, 4, and 7 June and adults emerged 9 June (1 ♂), 13 June (1 ♂), and 17 June (1 ♀).

On 28 March 1964 at a roadside park on Texas Highway 100 about 3.5 miles east of Los Fresnos, two males and three females were collected. One of the females was kept alive, and eggs were deposited on *S. secundatum*. This occurred at the beginning of a two-week field trip; the eggs hatched and the first-instar larvae were lost before returning to the laboratory.

Other collections of this species in the county by the writer and Mrs. Kendall are: October 17, 1963 at Brownsville (1 ♂, 1 ♀); March 29, 1964 on FM 1792 near Port Isabel (3 ♂). Special attention was not given to collecting this species.

*Erynnis juvenalis juvenalis* (Fabricius)

Burns (1964) indicated that *E. j. juvenalis* was strictly or essentially univoltine in Texas. Recent rearing records confirm these findings. Locally, *juvenalis* flies from early March to early May, with an occasional abnormally rapid development of immatures which produce adults later in the same year. Specimens reared from eggs at San Antonio, in an outdoor environment, except for one, produced imagines in March of the following year. This one larva matured early in the same season. It is doubtful that sufficient numbers of both sexes are produced in nature to establish a second brood.

Larval feeding continues over a period of 6 to 8 months depending upon the geographical location, after which the larva enters diapause. Judging from the reared sample, this species spends about 4 to 6 weeks in larval diapause and about the same length of time in the pupal stage.

In Texas *juvenalis* is less common than *Erynnis horatius* (Scudder & Burgess). This is attributed to the single brood and long larval period of *juvenalis*, which makes it more susceptible to predation and parasitism. Like *horatius*, adults of *juvenalis* are found associated with oaks, the larval food plant. Juvenile leaves are essential for first-instar larval development. Females deposit their eggs on or near juvenile leaves only, and it matters not whether the plant is a 6-inch seedling or a 30-foot tree.

Harrison County, 4 April 1964. At Caddo Lake State Park, a female was collected as it was about to oviposit on the juvenile leaves of a 5-foot *Quercus marilandica* Muenchh. A number of eggs were obtained by confining the female in a jar with terminal shoots of *Q. marilandica*. These eggs started hatching 13 April; others were preserved. On 30 April, five larvae were inventoried; by 10 August, four had died. The remaining larva was then preserved. Death was attributed to confinement of the larvae in closed rearing jars.

Kerr County, 4 April 1965. On FM 689 near Camp Verde, three males and three females were collected while they were feeding on blossoms of redbud, *Cercis canadensis* L. var. *texensis* (Wats.) Rose. One female was kept for oviposition. After depositing three eggs, she escaped. At the time of this writing (April, 1965) the three larvae were alive and feeding on *Quercus virginiana* Mill. var. *fusiformis* (Small) Sarg.

Polk County, 3 April 1964. On Nettles Cemetery road east of Livingston, a female was observed to oviposit on juvenile leaves of *Q. marilandica*. This oak was about 20 feet tall and the egg-laying female was out of reach; however, three eggs were recovered from twigs of one branch. These eggs soon hatched but were lost due to improper care in the field. Near this location on 16 March 1963, Kendall (1964) found numerous males flying but no females. This would indicate that females generally emerge later than the males.

Smith County, 4 April 1964. At Tyler State Park two females were observed to oviposit on oak. One deposited an egg on juvenile leaves of a 5-foot *Q. marilandica* bush about 3 feet above the ground. The other one deposited an egg on a 6-inch seedling of *Quercus stellata* Wang. Both were collected. The latter female was placed in a jar with the same seedling; 32 eggs were deposited the following day. Eggs started hatching 13 April and newly hatched larvae were offered juvenile leaves of *Q. fusiformis*, which they accepted. On 30 April an inventory disclosed 25 larvae, two of which were dead. On 11 May an inventory disclosed four more had died, leaving only 19. Two larvae were then preserved, and those remaining were placed on a caged living *Q. fusiformis* bush in the laboratory garden at San Antonio. cursory periodic examinations thereafter disclosed larvae to be doing fine. On 2 September a shelter was opened for examination, revealing an empty pupal case; the adult was nowhere to be found, and the exact date of pupation and emergence was therefore unknown. Probably it had emerged sometime earlier, died, and ants had eaten it.

On 13 September all larvae appeared to be feeding. On 15 November one larva appeared to be in diapause. Examination on 22 January 1965 disclosed 3 dead larvae, four more in diapause, and seven pupae, one of which had been killed by a predator. The four live larvae were then removed and placed in a small container for close observation. One larva escaped. Two others pupated 29 January and 6 February, respectively; the fourth died. Four males and four females emerged: 1 March (♂), 14 March (2 ♂, 1 ♀), 15 March (♀), 16 March (♀), 23 March (♂) (this one pupated 29 January), 29 March (♀).

One interesting development occurred on March 14 when one of the males escaped from its emergence container and was flying about inside a screened walk-in cage. As Mrs. Kendall and the writer watched, the insect chanced to light near a chameleon lizard which had gained entrance to the large breeding cage, and was immediately caught and swallowed.

The writer and Mrs. Kendall have collected *E. j. juvenalis* in the following Texas counties not previously recorded: Brown Co., Lake Brownwood State Park, 9 April 1964 (2 ♂, 1 ♀), 10 April 1964 (2 ♀); Cass Co., near Avinger, 6 April 1964, (1 ♀); Fannin Co., Bonham State Park, 7 April 1964 (2 ♂, 2 ♀); Kendall Co., 7 mi SE of Comfort, 4 April 1965 (1 ♂); Tarrant Co., Fort Worth city park, 8 April, 1964 (3 ♂, 5 ♀).

#### *Cogia calchas* (Herrich-Schäffer)

The distribution of the calchas skipper in Texas seems to be limited to Cameron and Hidalgo counties, correlating highly with the distribution of its local larval food plant, *Mimosa pigra* L. var. *berlandieri* (Gray) (Turner, 1959). This insect has been field collected from March to November. Reared specimens emerged in January, February, March, July,

August, and September. It has a larval diapause and therefore would not normally emerge in nature during January or February when its larval food plant is dormant. It appears to be triple-brooded.

Larval habits compare favorably with those of *Cogia hippalus outis* (Skinner) as described by Kendall (1965). The mature larva vacates its growing leaf shelter and constructs another on the ground under leaf litter and debris where it pupates.

Cameron County, 18 July 1964. In Brownsville, while the writer was collecting eggs and larvae from a 6-foot *M. berlandieri* plant growing in the edge of water, a female came and deposited an egg on a terminal leaflet of the plant being examined. The captured female died before reaching the laboratory. Two more ovipositing females were seen the same day but could not be collected. Several eggs and 28 larvae were collected in an hour or so. All the eggs and a small series of larvae and pupae were preserved. The remaining larvae were reared on *M. berlandieri*. Pupation occurred from 19 July to 19 August. Ten males and five females emerged: 28 July (♀), 31 July (♂), 3 Aug. (♀), 5 Aug. (1 ♂, 1 ♀), 6 Aug. (♂), 7 Aug. (2 ♂), 8 Aug. (♂), 10 Aug. (♂), 23 Aug. (1 ♂, 1 ♀), 28 Aug. (♂), 31 Aug. (1 ♂, 1 ♀).

The Brownsville area was revisited on 22 August 1964 and four more larvae were found on *M. berlandieri*. One larva died and the other three pupated 25, 26, and 28 August. Adults emerged: 3 Sept. (♀), 4 Sept. (♂), and 7 Sept. (♂).

On 4 December 1964, at a state-operated wildlife management area near Brownsville, three eggs and 19 larvae were collected on *M. berlandieri*. Three larvae and the eggs were given to Norman E. Flitters of Brownsville for study. The first of the remaining larvae pupated 22 December; the others were unobserved. A few died and several entered larval diapause. The immatures were kept under semicontrolled laboratory conditions with the result that most of them produced adults prematurely. Two males and six females emerged: 12 Jan. 1965 (♀), 13 Jan. (♀), 31 Jan. (♀), 6 Feb. (♂), 11 Feb. (♂), 14 Feb. (♀), 10 Mar. (♀), and 29 Mar. (♀). In nature, overwintering immatures should produce adults beginning about the middle of March.

The writer and Mrs. Kendall collected other adults in Cameron County on 17 Oct. 1963 (2 ♂), 19 Oct. 1963 (3 ♂), 29 March 1964 (1 ♀), and 18 July 1964 (1 ♂, 1 ♀). Freeman (1949 and 1951) recorded it from Cameron County in June, August, and October, and in Hidalgo County in March, May, June, August, September, and October. He also gave the writer a male collected 7 April 1945.

#### *Urbanus procne* (Plötz)

Neither the distribution of *U. procne* in Texas nor the factors influencing its distribution are well understood. The principal habitat of this species seems to be extreme south Texas where it is perhaps triple-brooded, with considerable overlapping. It has been collected in March, June, July, August, October, November, and early December. Reared adults emerged in August, September, and October.

It will come as a surprise to most students of the Pyrginae to learn that the larva of this insect is a grass-feeder. Other species of this genus may

also feed on monocotyledons. One of its most interesting larval habits is that a nest or shelter is not made until the larva is fully mature and then only as a place to pupate. When not feeding it hides in the grass near the ground. When ready to pupate, it constructs a shelter from grass litter and silk on the ground at the base of the clumps. Further research is necessary to determine whether or not an immature diapause occurs. Determination of the imagines was made by Dr. J. W. Tilden (1965).

Cameron County Texas, 19 July 1964. In Brownsville along the banks of a resaca, two ovipositing females were collected and eggs recovered from a species of grass not yet determined. Later in the day at another location in the city, two more females were collected as they oviposited on two other species of grass, one of which was Bermuda, *Cynodon dactylon* L. All four females were kept alive for additional oviposition. They were placed in separate containers and labeled A, B, C, and D. Eggs were deposited by each in the laboratory as follows: Female A, on *C. dactylon*, 19 July (1), 20 July (22), 21 July (5), female died same day. Female B, on *C. dactylon*, 19 July (1), 20 July (40), 21 July (9), 22 July (2); on *Stenotaphrum secundatum* (Walt.) Kuntze, 24 July (10), 25 July (62), 26 July (43), female died the same day. Female C, on *C. dactylon*, 19 July (1), 22 July (2); on *S. secundatum*, 24 July (4), 25 July (7), 26 July (15); it then died. Female D, on *C. dactylon*, 19 July (1), 20 July (11), 21 July (3); it then died.

Eggs hatched from 22 July to 31 July. First-instar larvae were offered *C. dactylon*, *S. secundatum*, and *Sorghum halepense* (L.) Pers. Only those on the *C. dactylon* survived. Where *S. secundatum* was mixed with *C. dactylon* only the latter was eaten. After progressing through five instars, the first larva pupated 19 August and the last one on 17 September. Examples of all immature stages were preserved. Adults emerged: 28 Aug. (1 ♂), 29 Aug. (2 ♂, 1 ♀), 31 Aug. (2 ♂, 1 ♀), 1 Sept. (3 ♂, 1 ♀), 2 Sept. (1 ♀), 3 Sept. (3 ♂), 4 Sept. (1 ♀), 7 Sept. (1 ♂, 1 ♀), 8 Sept. (1 ♂), 9 Sept. (1 ♀), 13 Sept. (1 ♂), 14 Sept. (1 ♂), for a total of 15 ♂♂, 7 ♀♀.

On a return trip to Brownsville two females were collected 22 August 1964. One of these deposited a few eggs in the laboratory on *C. dactylon*. The eggs soon hatched and the larvae crawled away unobserved except for two; one of these died later. The one remaining larva matured on *C. dactylon*; it pupated 25 September and a female emerged 7 October 1964.

Other Texas collection records by the writer and Mrs. Kendall are: Bexar County, 10 June 1956 (1 ♂); Cameron County, 17–18 Oct. 1963, common, 29 March 1964 (1 ♂), 21 Aug. 1964 (1 ♂, 3 ♀), 4 Dec. 1964 (1 ♀). Dr. J. W. Tilden (1965; in litt.) found *U. procne* common in Cameron County 17–30 Oct. and 11–13 Nov. 1963. In Hidalgo County he collected two worn males on 11 Nov. 1963.

#### *Chioides catillus albofasciatus* (Hewitson)

Kendall (1965) stated that an immature diapause was not indicated for this species. Additional rearing has shown that *C. albofasciatus* does have a larval diapause.

Cameron County Texas, 21 August 1964. At Brownsville a few adults were found flying; one female was collected and kept for eggs. It was confined in a glass jar with *Rhynchosia minima* (L.) DC., and numerous eggs were deposited during the next several days. When the eggs hatched, the first-instar larvae were placed on a caged living plant of *R. minima* in the laboratory garden at San Antonio. Only cursory examinations were made thereafter until two males appeared in the cage on 20 September. The cage was then removed and a thorough examination made with the result that 48 pupae, mostly on the ground under fallen leaves, and 16 larvae were found. Of these, five pupae and three larvae, ready to pupate, were sent to Dr. C. L. Remington for chromosome study. Ten of the larvae pupated: 27 Sept. (3), 29 Sept. (4), 30 Sept. (1), and 1 Oct. (2). This left three larvae which stopped feeding 17 October and entered diapause. They were placed outdoors in a screened cage on the ground and covered with dried leaves on 30 October. Periodic examinations disclosed that two of these larvae pupated about 21 February; the third larva died. From these pupae, males emerged on 8 and 10 March 1965.

Other adults from the same parent emerged: 30 Sept. (1 ♂), 1 Oct. (1 ♂), 2 Oct. (3 ♂), 3 Oct. (4 ♂, 2 ♀), 4 Oct. (7 ♂, 2 ♀), 5 Oct. (2 ♂, 2 ♀), 6 Oct. (3 ♂, 3 ♀), 7 Oct. (1 ♂), 8 Oct. (4 ♂, 2 ♀), 9 Oct. (2 ♀), 11 Oct. (1 ♂, 2 ♀), 12 Oct. (2 ♂, 1 ♀), 13 Oct. (1 ♂, 2 ♀), 14 Oct. (1 ♀), 15 Oct. (2 ♀), 17 Oct. (1 ♀), 18 Oct. (1 ♀), 20 Oct. (1 ♂), for a total of 31 ♂♂, 23 ♀♀.

A return visit to Brownsville was made on December 4 and 5, 1965. Two males were collected and numerous first- and second-instar larvae were found on *R. minima* growing along an irrigation canal. Only four larvae were collected because the food plant in the laboratory garden at San Antonio was already largely defoliated due to the advance of winter. A frost killed all the remaining food plant about December 15. One larva, very small, pupated January 1, 1965; the other three were preserved. On January 24 a dwarfed female emerged; the larva and pupa had been kept in the laboratory at all times.

These additional studies show the significance climate has on the distribution of *C. albofasciatus*. Except for extreme south Texas, this species cannot become established because too few larvae from the summer broods enter diapause and, secondly, because the average early date of the first freeze in the fall (Hildreth & Orton, 1963) kills the larval food plant, causing the immatures to die of starvation. Only under ideal climatological conditions could this species survive for more than one season as far north as Bexar County, Texas. Such a period existed from 1957 to 1959 (Kendall, 1965).

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## OCCURRENCE OF *CALLOPHRYS ERYPHON* (LYCAENIDAE) IN MICHIGAN

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For some time now, the record of *Callophrys eryphon* (Boisduval) from Michigan has been in doubt. Specimens representing this record have been assumed by many lepidopterists to fall within the usual *C. niphon* (Huebner) variation. Moore (1960) listed *eryphon* from Mackinac County, referring to two specimens collected on May 18, 30, one near St. Ignace and the other near Naubinway; however, the specimens were never positively determined to represent this hairstreak.

Recently, while examining butterflies in the collection at Northern Michigan College, I found a specimen in their *Callophrys niphon* series that strongly resembled *eryphon*, and it had been collected in Marquette County. Then on May 16, 1964, I collected four specimens in Chippewa and Luce counties (in the eastern Upper Peninsula) which fitted the description of *eryphon*. The specimens from Chippewa, Luce, and Marquette counties were subsequently examined by Harry K. Clench of the Carnegie Museum and found to be *C. eryphon*. The following is a quote from Clench's letter of September 16, 1964:

"The *eryphon* are . . . perfectly good *eryphon* though a little peculiar: they run slightly smaller; the females are more extensively fulvous above (but are nicely matched in this by a series from Moffat County, Colorado); and on the underside there is a tendency towards an increased suffusion of hoary gray scaling in the terminal spots of the hind wing, faintly reminiscent of the condition typical of *niphon*. All of these traits are exceedingly slight, however, and there is certainly no reason at this time to even think of separating them as a different subspecies."

The Marquette specimen is a slightly torn female taken by Richard L. Lake on May 22, 1960, a few blocks from the campus of Northern Michigan College within the city of Marquette—Township 49 North, Range 25 West, Section 10. This specimen is now in the writer's collection.

The Chippewa County specimens are two fresh females collected in company with females of *C. niphon clarki* (Freeman) (determined by H. Clench) and *C. augustinus* (Kirby) while sunning on a sandy road on