

male from the Exuma Cays as *E. दौरα ebriola*. This is now recognized as the winter (dry season) form of *E. दौरα palmira*; the date of capture was 13 January 1953.

In 1966 West (Ent. Record 78: 174-9, 206-10) belatedly reported on his captures of *E. दौरα* in 1945 and 1946. He found "flourishing colonies" outside Nassau, New Providence Island: in the wet season f. *jucunda*, in the dry season f. *daira*. These are the major seasonal morphs of subspecies *daira*.

Scott, in his list of Antillean butterflies (1971. J. Res. Lep. 9: 249-56), lists *E. दौरα* from the Bahamas where it is represented by the same subspecies as in the Greater Antilles, that is, spp. *palmira*. West's paper is omitted from Scott's references.

Clench (1977. Ann. Carnegie Mus. 46: 173-94) shows *E. दौरα दौरα* as common and presumably established on the north end of North Andros. As for the remainder of the Bahamas the literature is silent on *Eurema दौरα*.

Eurema दौरα दौरα was present though relatively uncommon in open wasteland near Lake Windermere, New Providence Island on 21 and 22 August 1979. Other *Eurema* were present: *E. nicippe* and *E. dina* abundant, *E. messalina* and *E. chamberlaini* frequent. In the previous month Mr. Denis Knowles had also collected *daira दौरα* on New Providence. All July and August specimens were of the wet season f. *jucunda*. On 2 February 1980 ssp. *daira* was found on Paradise Island, 2-3 miles northeast of downtown Nassau; the following day it was present on the Oakes Estate, 8 miles west of Nassau. The February material was of form *daira*.

Contrary to Riley's opinion we conclude *E. दौरα दौरα* is an established resident on New Providence Island and North Andros and was apparently started by migration from south Florida. *Eurema दौरα palmira* appears to be a non-established casual, so far found only once. The situation is identical with that in south Florida, where ssp. *daira* is a widespread and common resident and ssp. *palmira* is an exceedingly rare casual.

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DIAPAUSE AND NONDIAPAUSE EGGS LAID DAILY BY INDIVIDUAL *GRYLLUS FIRMUS* FEMALES (ORTHOPTERA: GRYLLIDAE)—
(Note). *Gryllus firmus* Scudder is the only *Gryllus* known to have 2 stages of facultative diapause in its life cycle. Though it and its close relative, *G. ovisopis* Walker, are morphologically similar, the 2 species differ markedly in their habitats, geographic distributions, and life cycles. Both species lay diapause eggs that overwinter, but *firmus* lays nondiapause eggs as well and has a facultative, midjuvenile diapause in its life cycle (T.J. Walker, 1974. Fla. Ent. 57: 21). Females of *firmus* vary from week to week in the proportions of diapause and nondiapause eggs they lay (T.J. Walker, Oecologia, in press). This note describes the *daily* egg laying pattern of *G. firmus* and an effect of cold on embryological development of diapause eggs.

Five females were captured 20 Oct. 1977, Gainesville, FL, and individ-

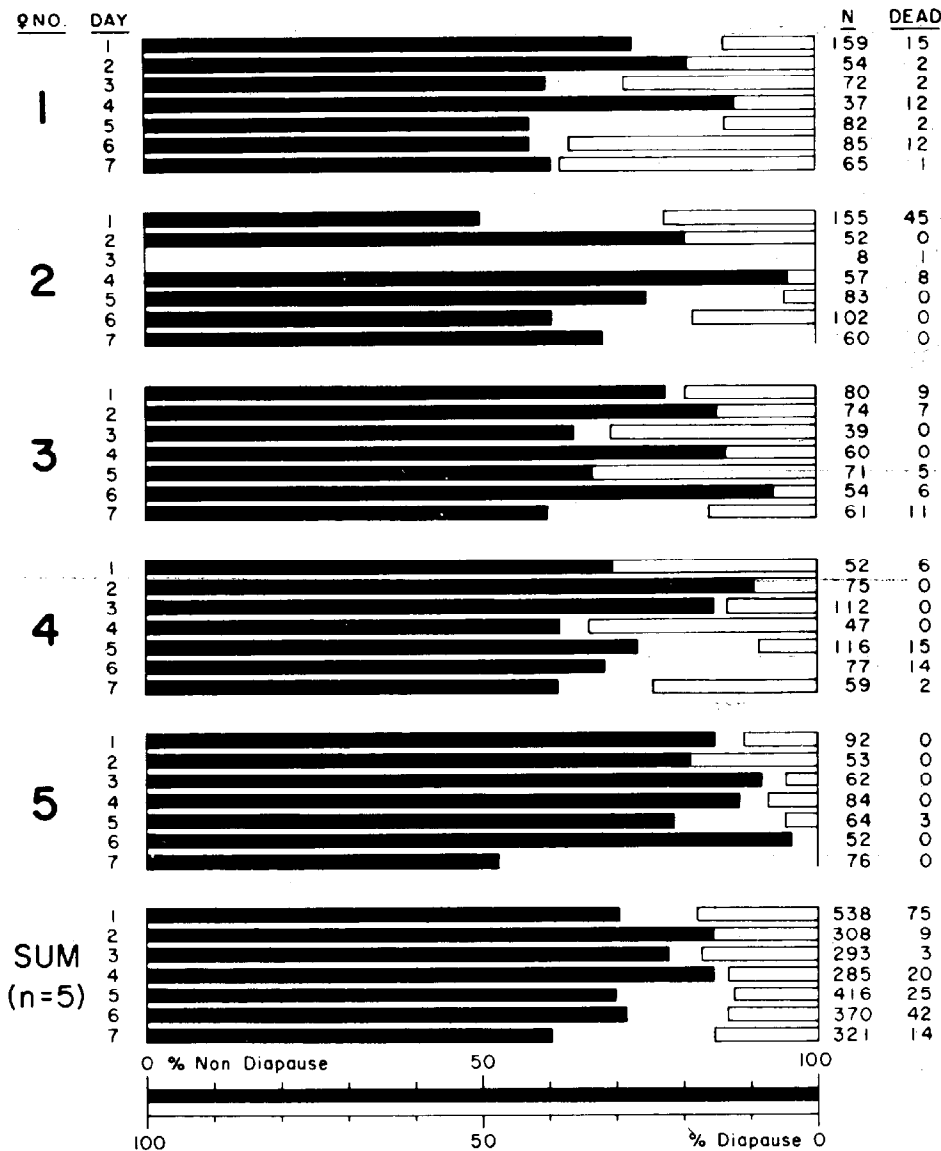


Fig. 1. Survival and diapause status of eggs collected daily from 5 females of *Gryllus firmus*. Solid bars (left) represent counts of hatchlings 2 days after initial hatch—i.e. nondiapause eggs. Open bars (right) represent eggs that were embryonated but had not hatched when the experiment ended (3 weeks after initial hatch)—i.e. diapause eggs. Spaces between solid and open bars indicate eggs that were missing—i.e. that disappeared between the hatching of nondiapause eggs and the counting of diapause eggs. They may represent (1) diapause (or nondiapause) eggs eaten by the hatchlings or (2) nondiapause eggs that hatched but with the hatchlings being eaten by others. (All empty egg shells disappeared, evidently eaten by hatchlings.)

Numbers on right are numbers of eggs laid during 24-hour period and numbers of eggs dying prior to hatching of nondiapause eggs (perhaps as a result of mechanical injury during extraction and transfer). Only the surviving eggs were used in calculating percent nondiapause, diapause, and missing.

The 7 surviving eggs for Female 2, Day 3, were nondiapause. (Minimum sample size graphed was 25.)

ually confined for oviposition in screen-capped gallon jars with 900 ml of moistened, sterilized sand. The jars were kept in a rearing room at $25 \pm 1^\circ\text{C}$, 16L:8D and tended daily for 1 week. Each afternoon the sand was removed from the jars and fresh sand substituted. Eggs were extracted by washing, placed on moist sand in petri dishes in the rearing room, and examined at 2-3 day intervals for embryological development and hatch. Two days after the initial hatch in each dish, all nymphs were counted and removed. In each dish no more hatch occurred for at least 3 weeks. The unhatched eggs were in the second phase of embryological development as outlined by A.D. Lees (The Physiology of Diapause in Arthropods, 1955) and were scored as diapause eggs (Fig. 1, Table 1).

TABLE 1. COMPARISON OF 5 FEMALES OF *Gryllus firmus* AS TO FECUNDITY AND PROPORTIONS OF DIAPAUSE AND NONDIAPAUSE EGGS.

Female no.	Number of eggs		Percent of surviving eggs		
	Total laid	Dead prior to 1st hatch	Non-diapause	Diapause	Missing* (therefore unclassified)
1	554	46	67	23	11
2	517	64	68	13	19
3	439	38	77	18	5
4	538	37	75	15	10
5	438	3	81	7	12
Total	2531	188	73	15	12

*Eggs present at first hatch but unaccounted for when hatching and diapause eggs were subsequently counted.

Gryllus firmus females collected in October in Gainesville lay both diapause and nondiapause eggs daily; the proportions vary from day to day (Fig. 1) and from female to female (Table 1).

We refrigerated half of the diapause eggs at $4.5 \pm 1^\circ\text{C}$ for 3 days and then returned them to the rearing room. Control eggs were held in the rearing room at $25 \pm 1^\circ\text{C}$. Both treated and control eggs were examined after 1 week. The cold-treated eggs had reached the third phase of embryological development (main organ systems differentiated) while the control eggs had not. Fall-laid eggs that require exposure to low temperatures before they are competent to develop rapidly at high temperatures will hatch in the spring rather than during warm weather in the fall. ROHANI IBRAHIM AND THOMAS J. WALKER, Department of Entomology and Nematology, University of Florida, Gainesville, FL 32611.

MAXILLAE OF THE MOLE CRICKETS, *SCAPTERISCUS ACLETUS* REHN AND HEBARD AND *S. VICINUS* SCUDDER (ORTHOPTERA: GRYLLOTALPIDAE): A NEW MEANS OF IDENTIFICATION—(Note). Two mole cricket species, *Scapteriscus acletus* Rehn and Hebard and *S. vicinus* Scudder, damage turf, pastures, vegetable and truck crops in Florida and other southeastern states. Characters commonly used to identify