SCIENTIFIC NOTES

PYEMOTES TRITICI (ACARI: PYEMOTIDAE), A PARASITE OF THE COFFEE BEAN WEEVIL IN FLORIDA—Pyemotid mites have been reported attacking coffee bean weevil (CBW), *Araecerus fasciculatus* (DeGeer) in Louisiana (Tucker 1909. USDA Bur. Ent. Bull. 64: 61-4) and *A. levipennis* Jordan in Hawaii (Sherman and Tamashiro 1956. Proc. Hawaiian Ent. Soc. 15: 138-48; Vaivanijkul and Haramoto 1969. Proc. Hawaiian Ent. Soc. 20: 443-54). The mites collected from *A. levipennis* were subsequently identified as *Pyemotes tritici* (Lagreze-Fossat and Montane) by Cross and Moser (1975. Ann. Ent. Soc. America 68: 723-32).

The straw itch mite, *P. tritici* parasitizes and kills many insects (Bruce and LeCato. 1979. Recent Advances in Acarology. Vol. 1: 213-20), but parasitization of CBW by this mite has not been previously reported.

From 1978-80, ca. 20 citrus grove sites with previously reported or suspected CBW problems were surveyed (Childers, in press. J. Econ. Ent.). Pyemotid mites were found to attack and to kill CBW larvae, pupae and adults in 'Hamlin' oranges during August and September, in 'Valencia' oranges during April and August, and in dried fruit of chinaberry from December through April in Lake County, Florida. Parasitized CBW ranged from 0-4% in dropped citrus fruit and 0-1% in dried chinaberry fruit. One or more pyemotid mites were observed attached to various paralyzed weevil stages. Sites of mite attachment on adults were under the elytra into the abdomen and at the suture lines between the pro- and mesosternum.

Positive identification is only possible with males. All males identified were *P. tritici* and all of the females collected were in the *P. ventricosus* group which includes *P. tritici.* These collections broaden both the geographic and host ranges of *P. tritici.* University of Florida Agricultural Experiment Station Journal Series No. 3607.—CARL C. CHILDERS, Agricultural Research and Education Center, University of Florida, 700 Experiment Station Road, Lake Alfred, FL 33850 USA; and EARLE A. CROSS, Department of Biology, Ecology and Systematics Section, University of Alabama, University, AL 35486 USA.

SPERM STORAGE IN MOLE CRICKETS: FALL MATINGS FERTILIZE SPRING EGGS IN *SCAPTERISCUS ACLETUS*—The mole cricket *Scapteriscus acletus* has but one generation a year in central Florida. Egg laying starts in March, peaks in May, and ends in September (Hayslip, N.C. 1943. Fla. Ent. 26: 33-46). Overwintering is both by late instar juveniles and by adults that achieved their final molt during fall. At least some fall-adult males call, and females can be attracted in substantial numbers to broadcasts of synthetic calling song during October and November (Walker, T. J., J. A. Reinert, and D. J. Schuster. 1982. Ann. Ent. Soc. America: submitted). These circumstances suggest that some *S. acletus* females mate in the fall even though they lay no eggs until the following spring. We studied the occurrence of fall mating and egg maturation by dissecting females and tested for long-term storage of viable sperm by holding isolated females in outdoor cages.

S. acletus females sometimes mate in the fall. Of 25 females caught flying

to synthetic calling song Oct.-Dec. 1978, 7 (28%) carried sperm. Of 5 females captured Oct. 1978 and caged outdoors with males for 1-3 months, 5 (100%) had sperm when dissected. In early November 1980 we placed each of 20 females collected at sound with a male in 500 ml. of moist sand. After 4 days at 25 ± 1°C and 16L:8D, 12 of the 20 (60%) had sperm in their spermatheca.

S. acletus females, even if mated, generally do not mature eggs in the fall. Fourteen females were captured at sound in October 1978 and held outdoors for one, two, or three months (n=5,4,5,) prior to dissection. Nine were caged alone (n=3 for each month of dissection); 3 had sperm; 6 did not. All of their oocytes were immature (≤1.1 mm long). As noted above, the 5 females that were confined with males had sperm. One of these, dissected 3 Jan. 1979, had nearly mature oocytes (>3.0 mm). On rare occasions *S. acletus* may mature and lay eggs in the fall: E. L. Matheny (personal communication, 1980) collected early instar juveniles in late November at Gainesville. However, subsequent collections at the same site suggested that such juveniles perished rather than contributed to the overwintering population.

S. acletus females can keep sperm alive for as long as 7 months. During fall 1979 and 1980, we exposed 32 sound-collected females to males for 4-23 days and then caged them individually beneath a shelter outdoors in sand-filled plexiglas observation units (1 x 29 x 29 cm inside dimensions). Every 1-2 weeks the crickets were given ca. 1 ml of ground dog chow and the sand was moistened and inspected for egg cells. When an egg cell was found, the cricket was transferred to a new cage and the clutch of eggs monitored for hatching. Of seven females that laid eggs, five apparently carried viable sperm (Table 1). (We did not refute the alternative hypothesis of facultative parthenogenesis but consider it unlikely because of the high percent hatch in clutches that produced nymphs: Maynard Smith, J. 1978. The evolution of sex. Cambridge Univ. Press, Cambridge; Harrison, R. G. 1982. Evolution 36: in press.) One female produced two successive fertile egg batches (27 Apr. and 19 May); another laid a fertile clutch (24 Apr.) followed by an infertile one (19 June). The three other fertile females pro-

TABLE 1. EGG PRODUCTION BY FALL FEMALES OF *Scopteriscus acletus* EXPOSED TO MALES 4-23 DAYS AND HELD SINGLY OUTDOORS IN OBSERVATION CAGES.

Category of females	Fall, winter, spring of 1979-80	1980-81
	(Number)	
Started in Oct.-Nov.[1]	12	20
Laying eggs Oct.-March	0	0
Surviving through March	7	6[2]
Laying eggs April-June	2	5
Laying fertile eggs April-June	1	4

[1]Based on 12 of 20 similarly treated females having sperm (see text), 38-82% of these females should have been inseminated (P=0.05, binomial distribution).
[2]Mortality was high when air temperature dropped to —10°C, 13 Jan 1981.

duced single clutches 17 May-5 June. The longest period between isolation from males and laying fertile eggs was 6 Nov. 1980 to 5 June 1981.

S. acletus occurs in disturbed, therefore transient, habitats. Females that mate at the first opportunity insure their capability of colonizing newly available habitats and do not forego later matings with choicer males (Forrest, T. G. 1981. M.S. thesis, Univ. Florida, Gainesville). *S. acletus* is not native to the U.S. (Walker, T. J., and Nickle, D. A. 1981. Ann. Ent. Soc. Amer. 74: 158-163), and it is possible that fall matings in Florida reflect a homeland where a second or partial second generation is produced each year. Matheny's finding young juveniles in November (see above) supports this hypothesis.

S. vicinus in central Florida has a univoltine life cycle similar to *acletus*, but Hayslip (1943, ibid) reported that 85% of *vicinus* overwintered as adults whereas only 25% of *acletus* did so. Nonetheless, fall flights to synthetic sound are later and sparser (Walker et al., 1982, ibid). Dissection of 24 females caught at sound in Gainesville, Nov.-Dec. 1979 and 1981, and 52 caught in Jacksonville, Nov. 1981, revealed that 1 of the 24 and 3 of the 52 had mated. Of 24 outdoor-reared *vicinus* females that were confined with males in 1.5 m diameter outdoor cages during fall 1981, only 2 had sperm by 15 Dec. Although the proportion maturing in the fall is larger for *vicinus* than for *acletus*, the proportion of fall adults mating in the fall is apparently greater for *acletus*.

Long term sperm storage has not been reported previously for crickets, but adults are generally short-lived and reproductive diapause is uncommon. In his review of cricket life cycles (1968. Quart. Rev. Biol. 43: 1-41), R. D. Alexander lists only three likely examples of adult diapause: two semivoltine mole crickets (winter diapause) and a univoltine burrowing cricket, *Brachytrupes aclatinus* (=*Brachytrypes portentosus*) (summer diapause). Two coneheads (Copiphorinae, Tettigoniidae) overwinter in adult reproductive diapause in north peninsular Florida: *Neoconocephalus triops* and *Pyrgacorypha uncinata* (Whitesell, J. J. 1969. M.S. thesis, Univ. Florida, Gainesville). Both species become adult in fall, but each remains reproductively dormant, eschewing calling, mating, and egg maturation, until spring.—T. J. WALKER and J. L. NATION, Dept. Entomology and Nematology, University of Florida, Gainesville, FL 32611 USA.

EGG PARASITISM IN THE GRASSHOPPER *ORCHELIMUM FIDICINIUM* (ORTHOPTERA: TETTIGONIIDAE)—*Orchelimum fidicinium* Rehn and Hebard is the most common grasshopper inhabiting salt marsh cord grass, *Spartina alterniflora* Loisel (Davis 1978. Pages 186-220 *In* An annotated checklist of the biota of the coastal zone of South Carolina, R. G. Zingmark, ed; Davis and Grey 1966. Ecology 36: 275-95). Eggs are inserted underneath leaf sheaths. From *O. fidicinium* eggs collected at Oyster Bay, Wakulla County, northwest Florida, we have reared out 2 species of egg parasite: an unidentified eulophid and a scelionid, *Macroteleia surfacei* (Hymenoptera: Scelionidae). The rearing of *M. surfacei* from *O. fidicinium* eggs represents the first host record for this parasite (P. M. Marsh, pers. comm.). In 205 eggs examined, the overall rate of parasitism was 18.5%;