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SEASONAL ABUNDANCE AND GEOGRAPHICAL DISTRIBUTION OF SOD WEBWORMS (LEPIDOPTERA: PYRALIDAE: CRAMBINAE) IN TENNESSEE

ELLIS L. MATHENY, JR.¹ AND E. A. HEINRICHS²

Department of Agricultural Biology, University of
Tennessee Institute of Agriculture, Knoxville 37916

INTRODUCTION

Sod webworm larvae are pests of the grass family and have become serious pests of lawn grasses. Sod webworm damage has been severe in Tennessee in recent years and has prompted a study to learn more about this group of insects.

Grote (1880) listed 42 crambines in North America, a number Klots (personal communication) expects to increase to 201, in 42 genera. Ainslie (1923, 1926) reported 41 Crambinae species from Florida and 17 from Tennessee (Ainslie, 1924). Heinrichs and Matheny (1969, 1970) have published additional Tennessee records.

Preliminary work in the Knoxville area in 1969 provided information on the seasonal distribution of Crambinae species (Heinrichs and Matheny, 1970). This paper reports on an extensive study of the species composition of the Crambinae, their relative abundance, and geographical and seasonal distribution in Tennessee.

MATERIALS AND METHODS

Ellico light traps utilizing 15 watt black light tubes were employed in or near grass fields at 6 locations across Tennessee

this study have been deposited. Scientific names as used herein are those recommended by Dr. Klots.

Hand collecting supplemented data concerning distribution and species composition. Extensive hand collections were made from 1968 to 1970 in the Knoxville area. During the summer of 1970, 2 collecting trips were made to West Tennessee. A minimum of 4 trips per year (1968 to 1970) to grassy areas on Stone Mountain (4000 ft elevation) and Roan Mountain (5600 ft elevation) in the Appalachians provided information concerning high altitudinal populations.

RESULTS AND DISCUSSION

The thirty-two Crambinae species collected are listed in Tables 1 and 2. Of these, *Crambus quinquareatus* Zeller, *C. multilineellus* Fernald, *C. albells* Clemens, *Microcrambus biguttellus* (Forbes), *M. minor* (Forbes), *Argyria argentana* (Martyn), *A. critica* (Forbes), *Eoreuma densella* (Zeller), *Haimbachia squamulella* (Zeller), *Thaumatoopsis edonis* (Grote), and *Euchromius ocellus texanus* (Robinson) are new state records.

A sequence-abundance relationship among the more numerous crambid moths caught in light traps is indicated in figures 1A and 1B. The bluegrass webworm, *C. teterrellus* (Zincken), and the larger sod webworm, *Pediasia trisecta* (Walker), were the most abundant species collected. *C. teterrellus* reached a peak of about 10,000 moths per week at Spring Hill (Fig. 1A). Apparently *P. trisecta* has adapted to Knoxville conditions over the last 40 years as Ainslie (1927) failed to collect any in Knoxville in 6 seasons of collecting in the 1920's. According to

TABLE 1: Collection location and date of rarely collected Crambinae moths.

Species	Location	Date
<i>Crambus leachellus</i> (Zincken)	Spring Hill	Early October
<i>Crambus albells</i> Clemens	Crossville, Cades Cove, Mountain City	Mid-June—Mid-July
<i>Crambus quinquareatus</i> Zeller	Crossville	Early September
<i>Crambus satrapellus</i> (Zincken)	Knoxville	Early May
<i>Crambus girardellus</i> Clemens	Mountain City	Early July
<i>Microcrambus biguttellus</i> (Forbes)	Mountain City	Mid-July
<i>Microcrambus minor</i> (Forbes)	Crossville, Cades Cove, Mountain City	Early July—Mid-September
<i>Argyria argentana</i> (Martyn)	Jackson	Late June
<i>Argyria critica</i> (Forbes)	Crossville, Knoxville	Mid-July
<i>Eoreuma densella</i> (Zeller)	Crossville, Knoxville	Mid-July
<i>Haimbachia squamulella</i> (Zeller)	Knoxville	Late July
<i>Thaumatoopsis edonis</i> (Grote)	Crossville	Late September
<i>Euchromius ocellus texanus</i> (Robinson)	Mountain City	Early May
<i>Diatrea crambidoides</i> (Grote)	Knoxville	Mid-July
<i>Diatrea grandiosella</i> (Dyar)	Blount County	Mid-July

in 1969: East Tennessee at Knoxville (975 ft elevation), Crossville (1850 ft elevation), Cade's Cove in the Great Smoky Mountains National Park (2000 ft elevation), and Mountain City (2500 ft elevation); Middle Tennessee at Spring Hill (650 ft elevation); and West Tennessee at Jackson (400 ft elevation). Traps were in continuous operation from April through October except at Jackson which was terminated in early September. Collections were removed from the traps daily and shipped to Knoxville for identification. Identifications were confirmed by Dr. A. B. Klots of the American Museum of Natural History in New York where representatives of each species collected in

¹ Present address: Department of Biology, Motlow State Community College, Tullahoma, Tennessee 37388.

² Present address: American Consulate, DNPEA Project, Porto Alegre, Brazil, APO New York 09676.

TABLE 2: Crambinae species collected from two grassy areas in the Appalachian Mountains.¹ 1968-1970.

Species	Location	
	Stone Mountain (4000 ft)	Roan Mountain (5600 ft)
<i>Crambus pascuellus floridus</i> Zeller	—	+
<i>Chrysoteuchia topiaria</i> (Zeller)	+	+
<i>Agriphila ruricolella</i> (Zeller)	+	+
<i>Crambus agitatellus</i> Clemens	+	—
<i>Pediasia mutabilis</i> (Clemens)	+	—
<i>Pediasia caliginosella</i> (Clemens)	+	+

¹ Absence is denoted by —, and presence by +.

Dr. Klotz it is closely related to a group which is northern in distribution but has apparently been able to develop a range of temperature tolerance to allow it to survive in warmer climates. Both *P. trisepta* and *C. teterrellus* were multivoltine and were collected from May to October. Other multivoltine species as

indicated by light trap records were *P. mutabilis* (Clemens), *A. nivalis* (Drury), *C. praelectellus* (Zincken), and *M. elegans* (Clemens). *Crambus teterrellus* and *P. mutabilis* appear to have 3 generations at Knoxville and only 2 at the higher elevation at Mountain City (Fig. 1A).

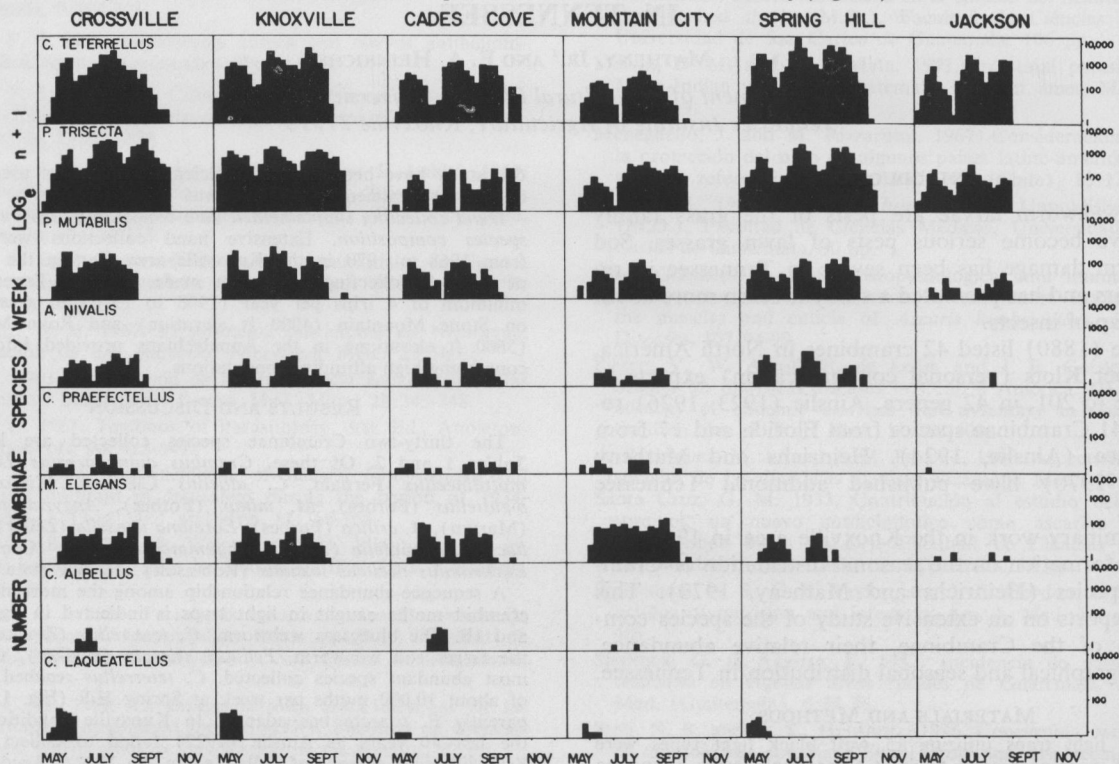


FIG. 1A: Seasonal abundance of Crambinae moths at various light trap locations in Tennessee, 1969.

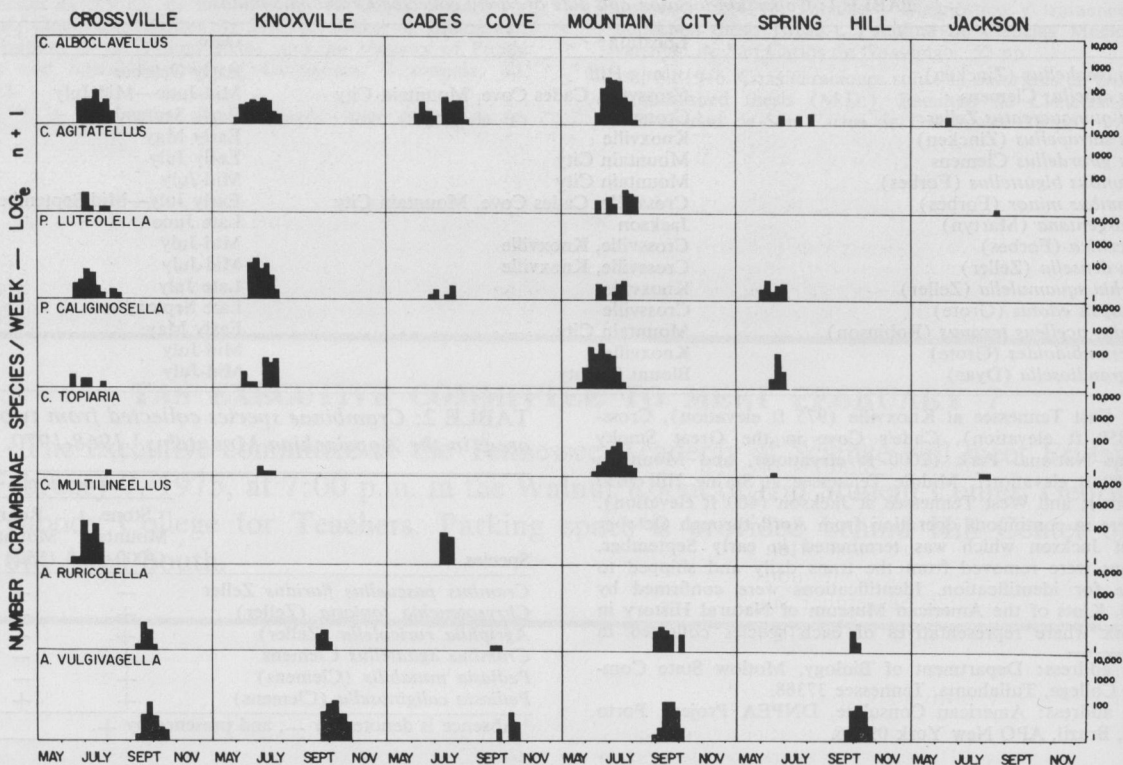


FIG. 1B: Seasonal abundance of Crambinae moths at various light trap locations in Tennessee, 1969.

There are numerous univoltine species in Tennessee and their seasonal flight periods are rather specific. *Crambus laqueatellus* Clemens is one of the earliest univoltine species of Crambinae to emerge in the spring and is in flight from early May to mid-June (Fig. 1A). *Agriphila ruricolella* (Zeller) and *A. vulgivagella* (Clemens) are 2 of the last species to be seen in the season, appearing in early September and continuing into October (Fig. 1B).

Many of the crambine species appeared to have extremely low population densities and were rarely collected by either light trap or hand (Table 1). Several of these were caught in light traps but never by hand which indicates the value of light traps as a survey tool in crambid studies.

Six species were collected from grassy areas in the Appalachian Mountains in East Tennessee (Table 2). *Chrysoteuchia topiaria* (Zeller) and *A. ruricolella* had very high populations on Stone Mountain and large areas of timothy, *Phleum pratense*

L., and Kentucky bluegrass, *Poa pratensis* L., had been destroyed (Fig. 2). *Crambus pascuellus floridus* Zeller, *C. topiaria*, and *A. ruricolella* were extremely abundant at Roan Mountain and each had distinct seasonal flight periods. Moths of *C. p. floridus* were first observed in early June and continued to late July. Next *C. topiaria* appeared in late June and were collected to early August. Last to emerge was *A. ruricolella* in early July and moths of this species were present to late August. In the latter, a sex difference was observed with males emerging a few weeks before females.

Roan Mountain was the only location in Tennessee where *C. p. floridus* was collected and it was extremely abundant there (Table 2). It is essentially boreal in distribution. Their occurrence at Roan Mountain is the southern limit of their distribution in North America and they have been able to extend so far southward because of the cool climate there (Klots, personal communication). This species is not present at the lower elevation at Stone Mountain.



FIG. 2: Area of bluegrass and timothy on Stone Mountain which has been damaged by sod webworm feeding (light areas).

CONCLUSION

There are numerous Crambinae species in Tennessee but most appear to have populations of non-economic significance. Species which were most abundant, as indicated by light trap records (*C. teterrellus* and *P. trisecta*), are those which are most often observed to be causing damage in lawns. The continuous occurrence of adults from May through September suggests that season long control measures must be applied when these species are abundant.

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