

Notes on the Ecology of the Prairie Mole Cricket, *Gryllotalpa major*, in Northeastern Oklahoma

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INTRODUCTION

Little information is available about the current distribution and ecology of the prairie mole cricket, *Gryllotalpa major* Saussure. At the time of the United States Department of Interior Fish and Wildlife Service's 1984 Invertebrate Species Notice of Review (49 FR21664) the prairie mole cricket was thought to be extinct. However, populations of these crickets are more common than previously thought (1, 2). Most of what is presently known about the biology and ecology of the prairie mole cricket has been summarized by Figg and Calvert (1).

Because of the known occurrence of prairie mole crickets in Mayes Co. and Rogers Co., Oklahoma (2), and because it was considered a Category One species in 1990 by the United States Department of Interior, the Oklahoma State Department of Transportation was required to conduct a survey along a proposed widening project of Highway 20 between Claremore and Pryor for prairie mole crickets. During the survey, noteworthy ecological information concerning the biology of these crickets was recorded.

METHODS

Two survey trips, one on April 28 and 29, 1990 and the second on May 19 and 20, 1990, were required to survey the 27.4-km stretch of Highway 20 between Claremore and Pryor. Six survey personnel were deployed in pairs (one on each side of the road) at varying intervals to walk sections of the roadside right-of-way to listen for calling male crickets. Each survey began approximately 15 min prior to sunset and continued for approximately 45 min after dark. A cassette player with a loop tape of the male prairie mole cricket call was played occasionally to remind each surveyor of the call. When a calling male was heard, an attempt was made to locate the burrow. A list of the conspicuous vegetation near each burrow was compiled.

RESULTS

Vegetation along the 27.4-km stretch of Highway 20 between Claremore and Pryor consisted of grassland areas interspersed between woodlands. Approximately 40% was woodland while 60% was a mixture of pasture land, commercially developed areas, and prairie-like areas.

Prairie mole crickets were located on the following dates at these localities:

•**April 29, 1990:** 6 km east of the Will Rogers Turnpike overpass. One cricket was located south of the road approximately 9 m from the pavement in a grazed and recently burned pasture. The pasture contained green milkweed (*Asclepias viridis*), yarrow (*Achillea lanulosa*), fleabane daisy (*Erigeron* spp.), blue-eyed grass (*Sisyrinchium campestre*), cudweed (*Gnaphalium purpureum*), large-bracted wild indigo (*Baptisia leucophaea*), fescue (*Festuca* spp.), little bluestem grass (*Schizachyrium scoparium*), and panic grass (*Panicum* spp.). Blackberries (*Rubus* spp.) occurred on the fence row.

•**April 29, 1990:** 6.8 km east of the Will Rogers Turnpike overpass. Prairie mole crickets were located in the front yard of a home north of the highway. Grass was approximately 15-30 cm tall. The following plants were noted: fleabane daisy, blueeyed grass, corn salad (*Valerianella radiata*), plains coreopsis (*Coreopsis tinctoria*), lovegrass (*Eragrostis* spp.), fescue, and panic grass. Two burrows were found approximately 12 m from the highway surface.

Two additional crickets and possibly four others were heard calling from near the house, approximately 55 m from the highway. Because the owner was not home at the time of the survey, we did not examine the site.

•**April 29, 1990:** 10 km east of the Will Rogers Turnpike overpass. A cricket was located 9 m from the road surface in the front yard of a home and removed for identification. The lawn consisted of closely cut (approximately 2.5 cm) crabgrass (*Digitaria ischaemum*), dandelions (*Taraxacum officinale*), and bermuda grass (*Cynodon dactylon*).

•**May 19, 1990:** 7.3 km east of the Will Rogers Turnpike overpass. Two cricket burrow systems were located beyond the ditch adjacent to the road, 4.6 m south of the highway surface. The burrows were approximately 9 m apart. Common plants were woodsorrel (*Oxalis stricta*), panic grass, sensitive briar (*Schrankia uncinata*), cudweed, green milkweed, spiderwort (*Tradescantia ohiensis*), geranium (*Geranium carolinianum*), Venus looking glass (*Triodanis perfoliata*), and fleabane daisy. Blackberries grew along the fence.

•**May 19, 1990:** 10 km east of the Will Rogers Turnpike overpass. A cricket was found near the roadside ditch, approximately 4.6 m south of the highway edge. Common plants were panic grass, cudweed, fleabane daisy, woodsorrel, sensitive briar, green milkweed, spiderwort, geranium, and Venus looking glass. Blackberries grew along the fence.

•**May 20, 1990:** 4.4 km east of the Will Rogers Turnpike overpass. Four calling crickets were heard and two burrows were located inside the fence at Will Rogers Downs. Across the highway to the south of this locale, three additional calling males were found in a grassy area 4.6 m from the road surface. Common plants were panic grass, green milkweed, little bluestem grass, fescue, switchgrass (*Panicum virgatum*), and blue-eyed grass.

•**May 20, 1990:** 4.8 km east of the Will Rogers Turnpike overpass. At least five crickets were heard calling from the grass area west of the Gible Gas Convenience Store and three burrows were located. Numerous other calling crickets were distributed from 9.1 m to as far back as 91 m off the road surface. Common plants in this secondary growth field were panic grass, fescue, switchgrass, little bluestem, golden wild indigo (*Baptisia sphaerocarpa*), cudweed, green milkweed, yellow-star grass (*Hypoxis hirsuta*), blue-eyed grass, fleabane daisy, yarrow, and geranium. Vegetation was about 30 cm tall.

After the survey time had expired (50 min after dark), a section of the highway was slowly travelled in a vehicle, with frequent stops to listen for calling crickets. Crickets were still calling at several sites, most near localities listed above. The exact number was not recorded since the survey time period had expired. No prairie mole crickets were heard along the forested stretch of Highway 20.

DISCUSSION

Historic records indicate the former distribution of prairie mole crickets was across the southwest portion of the tallgrass prairies; however, because of habitat destruction the range has declined and most extant populations were reported to be limited to remnant prairie areas (1, 3).

On the basis of numbers of prairie mole crickets located during this survey, *Gryllotalpa major* does commonly occur along at least one grassland portion of Highway 20. This grassland area includes the Will Rogers Downs area and extends approximately 8 km east to the edge of a forested hillside. Seemingly, prairie mole crickets do not occur in the forested sections along Highway 20 nor in any of the more urban and commercially developed areas along Highway 20 in Claremore and Pryor. The survey did not locate any prairie mole crickets in the grassland areas further east near Pryor although the grass areas are similar to those areas further west supporting mole crickets.

Figg and Clavert (1) stated that non-native habitats such as agricultural crop fields, old fields, fescue pasture and forest did not support populations of prairie mole crickets. Our survey suggested prairie mole crickets in this area of Oklahoma were exceptions. All the crickets located came from heavily grazed areas or other disturbed and non-native habitats. These consisted of hayfields, grazed pastures, closely mowed

front lawns of yards, and secondary growth fields.

Burrow structures were similar to those described by Figg and Calvert (1) and Walker and Figg (3) for prairie mole crickets. All burrows examined were Y-shaped out to the funnel or bulb-like resonant chamber areas. Tunnels which extended back from the calling chambers were about 2.5 cm below the surface. At the terminus of these, a vertical tunnel descended into the ground about 13-25 cm. Several blind-end tunnels (each several centimeters long) branched away from the main tunnel. In all burrows' examined, a single male was present.

Males commence calling in late April and continue through May (1). Figg and Calvert (1, 3) noted, as we did, that male crickets could be heard as far away as 400 m. Figg and Calvert (1) indicated evening calling sessions of male prairie mole crickets had a duration of about 50 min commencing 5-10 min following sunset and ending abruptly at darkness. Our observations differed in regard to the duration of calling and suggest that at least in this area of Oklahoma prairie mole crickets called much longer after dark. Three males monitored began calling at dusk and continued well past full darkness for at least one and one-half hours. During a drive through the area 60-90 min after dark, we continued to hear prairie mole crickets calling. Crickets may call for a longer period adjacent to the highway because lights from vehicular traffic along the road may disturb the internal timing of the insects. The lights of each passing car would have illuminated the roadside, possibly causing the crickets to consider the light as sunset.

On one occasion we noted a switching of the call from each part of the forked burrow opening. Possibly, the male was alternating his call from each resonance chamber in order to broadcast to a larger area.

While handling the crickets, a possible defensive action was noted that has not to our knowledge been reported. Two males picked up for identification purposes squirted a black fluid from the anus. The fluid did not have any noticeable odor nor did it irritate human skin. However, this action by the cricket may be confusing or irritating to a potential predator.

Since several crickets located were on road shoulders, it may be that road shoulders could provide usable habitats for this species. However, it is unknown if calling males near the highway surface would have been successful in attracting a female. It may be that proper soil types and vegetation are necessary before females will respond. Even if a female responded to a male located on the roadside areas, these areas may not be suitable for egg deposition and development. Clearly, much still remains to be learned about the ecology and biology of the prairie mole crickets in Oklahoma.

ACKNOWLEDGMENTS

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REFERENCES

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