A RATING SYSTEM FOR EVALUATING TAWNY MOLE CRICKET, *SCAPTERISCUS VICINUS* SCUDDER, DAMAGE (ORTHOPTERA: GRYLLOTALPIDAE)[1]

Patricia P. Cobb and T. P. Mack[2]
Entomology Department and Alabama Agricultural Experiment Station
Auburn University, AL 36849-5629
(Accepted for publication 16 August 1988)

ABSTRACT

Scapterisus vicinus Scudder mole cricket abundance as determined from soap flush counts was compared to a rating system. Soap flush counts linearly increased with an increase in rating ($P < 0.0001$, $r^2 = 0.92$). Thus, the less intensive rating system could be used for estimating mole cricket damage in field experiments.

Key Words: Tawny mole cricket, *Scapteriscus vicinus*, soap flush, rating.

J. Entomol. Sci. 24(1): 142-144 (January 1989)

INTRODUCTION

The southern mole cricket, *Scapteriscus acletus* Rehn and Hebard, and the tawny mole cricket, *S. vicinus* Scudder, are economically important pests in the southeastern United States that damage turf, pastures, gardens, nurseries and crop lands (Ulagaraj 1975). Mole crickets damage plants by tunneling through the soil; *S. vicinus* also does extensive damage by feeding on plant parts (Matheny 1981). The mobility of these pests, their rapid and severe damage, and the limited number of biological and chemical controls, have increased the search for new control efforts across the South (Walker 1984).

Control programs for mole crickets on turf have consisted since the 1930's primarily of insecticide applications (Kepner 1984). Evaluation of such insecticide screening programs has included counts of dead or moribund mole crickets on the soil surface after treatment, and counts of crickets flushed from the soil with soapy water after treatment (Short and Koehler 1979). These are laborious and intensive sampling techniques that limit the number of plots that can be effectively examined per hour. A less intensive but reliable mole cricket sampling technique would be very useful in the evaluation of insecticide-treated plots. The need for reliable techniques for evaluation of mole cricket damage control efforts continues as *Scapteriscus* species extend their range each year.

A rating system for evaluation of insecticide screening plots was developed in 1983. This study quantifies the relationship between the rating system and numbers of mole cricket (*S. vicinus*) nymphs determined by soap flushing.

MATERIALS AND METHODS

A hybrid (Tiftway 419) bermudagrass fairway in Mobile, Alabama was selected for the study. Soap flush and rating sampling techniques were compared on 21

[1] Alabama Agricultural Experiment Station Journal Series no. 17-881599p.
[2] Extension Entomologist and Associate Professor, respectively.

July and 24 August 1987. One hundred soap flushes and 100 rating samples were collected each date from 0800 to 1000 h CST. Evaluations of mole cricket damage were made using a 0.6 m^2 frame (76 by 76 cm) divided into nine equal, square-shaped sections. The frame was placed on the ground and the number of sections which contained mounds and/or tunnels was counted. The presence of mounds and tunnels was determined visually and by touch. Damage ranged from zero (no damage present in any of the nine sections) to nine (nine sections contained mole cricket mounds and/or tunnels). Damage was rated first at each location on the ground, and then the 0.6 m^2 area was flooded with 8 liters of soapy water (0.4 liters liquid detergent plus 7.6 liters water). Each sample was separated on all sides from other samples by at least 1 m. Mole crickets that surfaced within the frame within 10 min. after flushing were collected, counted and recorded. A random sample of 100 mole crickets collected on each date was examined and pronotal lengths measured and recorded to determine the relative age of mole cricket nymphs.

Regression analysis was used to determine if counts from soap flushes were related to rating. Counts were weighted according to the proportion of mole crickets in the 100-cricket samples that possessed pronotal lengths of $\geq$ 6 mm. Thus, counts were multiplied by 0.46 for the 21 July data and by 0.86 for the 24 August data. This was used because cricket age distribution varied with sample date.

RESULTS AND DISCUSSION

Average pronotal lengths for nymphs collected 21 July 1987 was 5.36 mm and for 24 August 1987 it was 6.94 mm. The latter sampling date contained a larger percentage of large crickets (Fig. 1). All mole crickets measured in random samples were *S. vicinus*.

Soap flush counts per 0.6 m^2 were linearly related to rating (Table 1). Slopes and intercepts $\pm$ 2 SEMs overlapped for the two sample dates indicating that a single regression line could be developed from both data sets. Soap flush counts linearly increased with an increase in rating with the combined data (Table 1). Thus, within the range of counts encountered, changes in mole cricket population size could be predicted from changes in ratings as well as from flush counts: $Y = m \cdot X + b$, where Y = number of mole crickets per 0.6 m^2, m = 0.57, X = rating, and b = -0.78. These data indicate that for the sample dates studied, the less intensive mole cricket rating system could be used to estimate population size. However, further comparisons of these two techniques in other locations and for different turf types are needed before the rating system is extensively used.

Limitations of the rating system restrict its use to those periods of time when mole crickets are large enough to produce visible mounds and / or tunnels. An assumption implicit in the use of the rating system is that the user can accurately distinguish between turf that has been damaged by mole crickets from turf damaged by other pests. An additional limitation is that the mobility of these pests (i.e., spring and fall flights, mobility through the soil) restricts its use to damage produced by mid-season nymphal populations. Also, the rating system should not accurately estimate extremely high mole cricket populations that consistently damage all nine sections of the 0.6 m^2 sample. At lower densities, a combination of the two methods, such as soap flushes on young nymphs followed by ratings several weeks later could save time and effort in comparing treated and untreated plots.

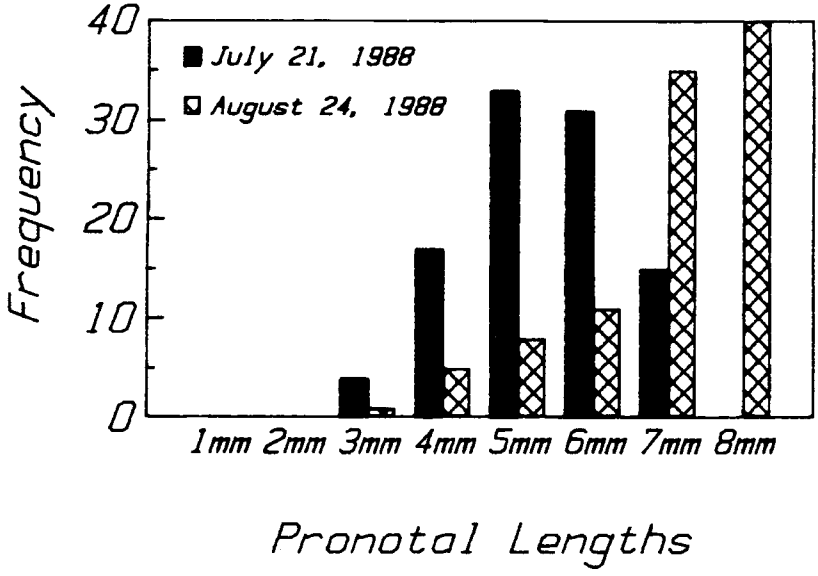

Fig. 1. Pronotal lengths of 100-mole cricket (*S. vicinus* Scudder) samples from soap flush evaluations.

Table 1. The relationship of the number of mole crickets flushed with the soap flush technique to the 0.6 m^2 rating system*.

Date	N†	Slope ± SE	Int. ± SE	Prob.	r^2
21 July 1987	9	0.55 ± 0.06	-0.53 ± 0.32	<0.0001	0.93
24 August 1987	9	0.60 ± 0.09	-1.03 ± 0.49	0.0002	0.87
Combined	9	0.57 ± 0.06	-0.78 ± 0.36	0.0001	0.92

* Relationship employed was $Y = m \bullet X + b$, where Y = number of mole crickets per 0.6 m^2 and X = rating.

† Number of means used in the analysis.

LITERATURE CITED

Kepner, R. L. 1984. Chemical control of mole crickets. pp. 41-48. *In* Mole Crickets in Florida, Univ. Fla. Agric. Expt. Stn. Bull. 846. 54. pp.

Matheny, E. L. 1981. Contrasting feeding habits of past mole cricket species. (Orthoptera: Gryllotalpidae). J. Econ. Entomol. 74: 444-45.

Short, D. E., and P. G. Koehler. 1979. A sampling technique for mole crickets and other pests in turfgrass and pasture. Florida Entomol. 62: 282-83.

Ulagaraj, S. M. 1975. Mole crickets: ecology, behavior and dispersal flight (Orthoptera: Gryllotalpidae: *Scapteriscus*). Environ. Entomol. 4: 265-73.

Walker, T. J. 1984. Mole Crickets in Florida. Univ. Fla Agric. Expt. Stn. Bull. 846. 54 pp.