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DISTRIBUTION OF *EUMICROSOMA BENEFICA*
(HYMENOPTERA: SCELIONIDAE) IN SOUTHERN CHINCH BUG
(HEMIPTERA: BLISSIDAE) POPULATIONS

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St. Augustinegrass, *Stenotaphrum secundatum* (Walter) Kuntze, is a widely used turfgrass in tropical and subtropical climatic regions (Sauer 1972). It is a commonly grown residential turfgrass species in the southern United States, covering 400,000 ha and accounting for 85% of the sod industry in Florida with an estimated value of \$262 million (Haydu et al. 2005). The southern chinch bug, *Blissus insularis* Barber (Hemiptera: Blissidae), is the most serious insect pest of St. Augustinegrass (Crocker 1993). Management of this insect has been challenged by its development of resistance to several key insecticides (Reinert & Portier 1983; Cherry & Nagata 2005, 2007) and overcoming host plant resistance (Busey & Center 1987; Rangasamy et al. 2006).

The egg parasite *Eumicrosoma benefica* Gahan is the only known parasite of southern chinch bugs in Florida. Reinert (1972) first noted the parasite on southern chinch bugs in Florida and noted various aspects of its biology. In a later study of the natural enemy complex of Florida chinch bugs, Reinert (1978) again noted that *E. benefica* was the only parasite found. These previous studies provided information on the biology of the parasite, but did not provide a large scale survey of the overall distribution or parasitism rates of the parasite in chinch bug populations in Florida. McColloch & Yuasa (1915) reported the *E. benefica* was an important factor in the control of the chinch bug *B. leucopterus* (Say) in Kansas. More recently, Wright & Danielson (1992) reported that the wasp parasitized large numbers of eggs of *B. leucopterus* in Nebraska. Because of the potential importance of *E. benefica*, the objective of this study was to better understand the impact of the parasite on southern chinch bug populations in Florida.

Parasite samples were obtained from 3 contiguous counties (Palm Beach, Martin, and St. Lucie) located in the heavily urbanized southeastern coast of Florida. St. Augustinegrass is commonly used here and the chinch bugs have year round activity (Reinert 1972) because of the climate. Samples were taken for a 1-year period starting Jan 2009. Each 2 months, 1 different infestation was sampled in each county. Chinch bug infestations were located by driving in urban areas and looking for chinch bug damage (i.e., dead or yellow patches of St. Augustinegrass). The presence of chinch bugs (adults and nymphs) was then verified by visual examination for the insects in the grass. Chinch bug eggs are often found in crevices

at the grass node or hidden between overlapping grass sheaths on St. Augustinegrass stolons (Nagata & Cherry 1999). These stolons are horizontally growing stems that root at nodes and vary in length e.g., similar to strawberry runners. Ten 50-cm St. Augustinegrass stolons were cut and bagged at each location. These clippings were taken to a laboratory where they were cut by hand with scissors and washed through a series of sieves with eggs being caught in the smallest sieve (U.S.A. Standard Testing Sieve #325, 45 micrometer opening) made by Fisher Scientific Company, U.S.A. A microscope was used to find eggs in the sieve which were identified as southern chinch bug eggs based on Vittum et al. (1999). Eggs were placed in vials (1 egg/vial) on a small piece of moistened paper and stored at 25°C. Eggs were examined microscopically each 2-3 d for chinch bug or parasite emergence for 30 d. McColloch (1914) reported that the average length of life cycle of *E. benefica* ranged from 10 to 28 d depending on temperature. Parasites emerging were stored in alcohol for later species and sex identification. Sex identification of *E. benefica* was determined based on descriptions of Gahan (1914).

An average 54.8 ± 15.8 SD eggs were collected per sample from the 18 samples (3 counties \times 6 sampling times). Of these eggs, 57% were viable yielding chinch bugs or parasite emergence. Besides natural mortality, invariably some mortality was caused in processing the grass to obtain the eggs although this latter mortality is unknown. *Eumicrosoma benefica* was the only parasite found emerging from the eggs. The parasite was found in all 3 counties. This parasite was first reported in Florida in 1972 by Reinert (1972), although its overall distribution in the state is currently unknown. The parasite was found in samples in all time periods showing year round activity. These results are consistent with Reinert (1972), who observed *E. benefica* throughout the year in southern Florida.

In this study, the parasite was found at all chinch bug infestations sampled showing a widespread distribution and close association with southern chinch bugs. This is consistent with McColloch & Yuasa (1914), who noted that the parasite was found every place that eggs of the chinch bug *B. leucopterus* (Say) were found. The mean % parasitism at all locations was 20.2 ± 17.5 SD and ranged from 2 to 48%. Not using eggs, Reinert (1972) used adult *E. benefica* and

nymphal and adult *B. insularis* from one area to determine a parasite/host ratio. Interestingly, his parasite/host ratio was 27.7%, approximating the 20.2% parasitism rate I found from egg emergence. McColloch & Yuasa (1914) reported an average 16% parasitism rate of the parasite in *B. leucopterus*. More recently, Wright & Danielson (1992) reported 47.2% parasitism of *B. leucopterus* by *E. benefica* in wheat fields in Nebraska. However, at least in southern Florida, the parasites are active year round. Hence, the low parasitism rate in this study is somewhat deceptive since it represents an instant in time and not the larger cumulative mortality to chinch bugs over time. The topic of low parasitism by *E. benefica* underestimating chinch bug mortality was discussed much earlier by McColloch & Yuasa (1914), who concluded that the parasite was an important factor in *B. leucopterus* control (McColloch & Yuasa 1915).

In this study, an average of 62.0 ± 43.1 SD percent of parasites were females in the populations sampled. McColloch & Yuasa (1914, 1915) concluded that females of *E. benefica* exceeded males in both field and laboratory tests. Reinert (1978) reported that 42.8% of the parasites were females in his field samples in Florida. In Nebraska, 64% of the wasps were female (Wright & Danielson 1992). Data from this study and the previous studies indicate that both sexes will normally be present under varying ratios.

SUMMARY

The parasitic wasp *Eumicrosoma benefica* has year round activity and was found at all southern chinch bug infestations that were sampled in southern Florida. This parasite is an important, if not the most important, biological control agent in reducing southern chinch bug populations in southern Florida.

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