IMPACT OF RICE WATER WEEVIL IN WATER CONSERVATION RICE PRODUCTION SYSTEMS

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Abstract

An experiment was conducted across five locations in four counties throughout the Mississippi Delta to determine the spatial and temporal distribution of rice water weevil, *Lissorhoptrus oryzophilus* Kuschel, in furrow irrigated rice production systems. Each location was divided into three zones characterized by the water level on each. All locations were sampled at three, four, and five weeks after the initial irrigation event had occurred. Samples were taken with a core sampler in order to collect and record rice water weevil larval densities on a per core basis. The bottom end of the each field remained flooded throughout the growing season and was given the title zone three. The middle portion of the field remained saturated throughout the growing season but had little to no standing water on it and was given the title zone two. The upper end of each field dried completely until soil cracking between each irrigation event and was given the title zone one. Rice water weevil larvae densities were highest in zone three throughout the growing season at all five locations.

Introduction

Rice water weevil, *Lissorhoptrus oryzophilus* Kuschel, is the single most severe insect pest of rice in Mississippi. Flooded conditions are the driving force behind the severity of rice water weevil infestations (Hesler, Grigarick et al. 1992, Thompson and Quisenberry 1995). Adult rice water weevil will not oviposit until the field is placed under flooded conditions. Yield loss occurring from adult rice water weevil feeding causes "skeletonized" lesions along the venations of leaves, but no yield loss has been recorded from this feeding damage No research has been conducted on how furrow irrigated rice production systems effect the incidence and intensity of rice water weevil populations (Zou, Stout et al. 2004). Because irrigated rice is the leading consumer of water in agriculture, effective and efficient irrigation strategies are needed in order to achieve sustainability for rice production (Satyanarayana, Thiyagarajan et al. 2007). The purpose of this research is to determine the spatial and temporal distribution of rice water weevil in furrow irrigated rice.

Materials and Methods

In order to determine rice water weevil distribution in furrow irrigated rice, an experiment was conducted on several commercial producer's fields. A total of five locations, across four major rice producing counties, in the Mississippi Delta were sampled. Each location was sampled weekly for three weeks, with the first timing occurring after the initial irrigation event took place at a specific location. At every location, fields were split into thirds and categorized into zones based on the water level that the zone held. The upper end of the fields, or the third of the fields that dried completely to cracking, was categorized as Zone 1. The middle third of the fields remained muddy throughout the growing season and was categorized as Zone 2. Finally, the lower third of the fields remained under some level of flooded conditions throughout the entire growing season and was categorized as Zone 3. A total of fifteen core samples were taken within each of the zones at all locations. Samples were then transported back to the lab were weevil larva numbers were counted and recorded. All statistics were analyzed with PROC GLIMMIX in SAS 9.4.

Results

There were significantly higher weevil numbers in zone 3 during the third and fifth weeks of sampling across all locations, with no significant differences between zone 1 and zone 2 during any week of sampling. However, areas of the field that completely dried to cracking (zone 1) had lower larval densities than areas of the field that remained muddy (zone 2) for all locations. Rice water weevil did infest every zone of the field at some level so management of this pest should still continue regardless of water management strategy.

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