



## Mississippi Corn Promotion Board 2018 Progress Report

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**Project Title:** Investigating Methods to Improve Corn Stand Development

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### Project Summary (Issue/Response)

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Corn is well-known to be a crop very responsive to early planting. Early-planted corn is normally more productive because its sensitive reproductive stages occur when temperatures are milder and soil moisture is generally more abundant, compared to later in the summer. However, early planting will invariably expose seedlings to more adverse environmental conditions, including cooler soil temperatures and abundant soil moisture, which will hamper growth rate and can lead to developmental issues. This can lead to reduced stand density, variable plant spacing and emergence disparity which will reduce corn productivity and potentially counteract benefits associated with early planting. In fact, Mississippi Corn Promotion Board sponsored research recently documented corn yield reduction up to 18% from solely emergence disparity. This yield loss is equivalent to that produced by a 40 percent stand loss or 20 day planting delay. Thus, refining practices to mitigate these detrimental effects could produce big dividends for Mississippi corn producers.



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### Project Results/Outcomes

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A field study was initiated to evaluate how altering management practices affect corn seedling establishment, development and productivity as part of a Master of Science graduate student research program. Early planting is an important component of high corn productivity, but southern growers are recurrently challenged by adverse environmental conditions during the spring planting season which hamper seedling growth and lead to stand variability and other developmental issues. Furthermore, recent research funded by the Mississippi Corn Promotion Board showed corn is very sensitive to developmental disparity created during seedling establishment. Thus, this research was initiated to evaluate how seeding depth and raised bed height may affect corn seedling establishment and development, since both of these factors may directly affect water relations and ambient soil temperature encountered. We evaluated corn planted at four seed depths varying from 1 ½ to 3 ¼ inches and grown on three raised bed heights. Preliminary results indicate moderate planting depth and higher raised bed height increase corn seedling emergence rate and stand uniformity. Deep seeding depth and shallow bed height assuredly increase soil moisture content and exposure to soil saturation, where anaerobic conditions may stunt seedling growth and increase seedling mortality. Likewise, deeper seeding depth and small beds reduce soil temperature immediately encompassing the seed, which diminish seedling growth rate and vigor.

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## Project Results

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This research investigates factors which commonly hamper stand uniformity. It will also quantify effects associated with management practices, such as raised bed preparation and planting depth on seedling development.

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## Project Impacts/Benefits

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This research will document how key environmental factors and management practices impact corn seedling establishment and development. Therefore, we can refine planting guidelines and potentially develop new systems which mitigate the limitations which normally restrict corn planting and stand establishment in our unique environment. Corn is extremely responsive to early planting and stand uniformity and high rainfall substantially commonly restricts planting opportunity in our region. Therefore, findings which enhance corn planting and stand establishment will produce big dividends for Mississippi producers.

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## Project Deliverables

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MSU Row Crop Short Course, Starkville, MS. 12/4/2018.

Mid-South Association of Wheat and Feed Grain Scientists, Madison, AL. 8/13/18.

Research program associated with Master of Science Graduate Student candidate Nolan Stapleton.