## SITE-SPECIFIC HARVEST-AID APPLICATIONS WITH A POINT-INJECTION SPRAYING SYSTEM Nathan W. Buehring, Daniel B. Reynolds, Jason C. Sanders, Kent M. Bloodworth, L. Tom Barber and David G. Wilson Mississippi State University Mississippi State, MS

## **Abstract**

Harvest-aids have three interrelated basic purposes in cotton (*Gossypium hirsutum L*.): defoliation, boll opening, and weed control/desiccation. Individual harvest-aids have specific strengths and weaknesses. Cotton harvest-aid applications are generally based upon the average condition of plants for a specific field. Over-application, applying more than is necessary, of harvest-aids can result in lower lint quality and reduced profitability, while under-application, applying an insufficient amount, can result in repeat applications, which can also reduce profitability.

The ability to apply harvest-aids site-specifically based upon crop conditions could potentially decrease material costs, while optimizing efficacy. Harvest-aids could be applied site-specifically by using a point-injection spraying based upon treatment maps generated from field data entered into a Geographical Information System (GIS). A point-injection spraying system directly injects undiluted harvest-aids into the carrier hose. Different harvest-aids and rates can be automatically injected as the applicator drives through a field. This technology would allow applicators to vary rates of individual products, as well as products within individual fields. This would allow higher rates of ethephon to be used in parts of the field with fewer open bolls. Additionally, higher rates of thiadiazuron could be used in areas of the field containing juvenile foliage, while a phosphate material could be used in a more mature area with little juvenile foliage. Site-specific treatment maps are currently being developed from ground-truthed data. Future site-specific applications could integrate the use of digital imagery for crop assessment and subsequent development of treatment maps.

The objective of this research was to investigate the possibilities of using point-injection spraying systems for site-specific harvest-aid applications. While conducting this research many problems were encountered. First, ground-truthed data collection was very laborious, thus indicating that other means of assessment, such as remote sensing, will be essential. Secondly, the development of treatment maps usable by the injection controller software was not easily achieved. An unacceptable time-lag between scouting and development was encountered. This was partially due to software limitations and the knowledge level of the users; however, the needed software is expensive and requires expensive yearly updates. Furthermore, the software doesn't support a full six channel system. Thirdly, many of the harvest-aid products had unique characteristics that present specific challenges to the use of an injection system. Ethephon is a very corrosive, which adversely affects some of the point-injection spraying system components, particularly hoses on the disystolic pumps. Other products, like Harvade, have viscous formulations that can be difficult for the injection system to pump undiluted. As a result of several complications with this system, this experiment could not be completed in a timely fashion in 2000 field trials. Currently, we are working with engineers to modify the system to facilitate its use in 2002.