

IMPROVING THE PERFORMANCE OF A COTTON GIN PLASTIC CONTAMINATION CLEANER**Derek Whitelock****Paul Funk****Carlos Armijo****USDA-ARS Southwestern Cotton Ginning Research Laboratory****Las Cruces, NM****Neha Kothari****Vikki Martin****Cotton Incorporated****Cary, NC****Abstract**

The GoldenLion is a seed cotton contamination and leaf cleaner currently utilized in cotton gins in China. Previous tests showed that the cleaner was more effective than a stick machine and an inclined cleaner at removing 1-layer and 3-layer round module wrap (RMW) and shopping bag plastic pieces from seed cotton. Increasing airflow to the cleaner increased overall plastic capture from about 13% to 50%, but the seed cotton captured with the plastic also increased from 3 to 75 lb. per bale. Smaller pieces were more effectively removed. Lighter and more flexible 1-layer RMW and shopping bags were removed within the range of the manufacturer's claims, but heavier and stiffer 3-layer RMW was not effectively removed. Video captured during testing revealed that pieces of plastic adhered to the cleaner's screen drum for separation but, as the screen drum rotated and the plastic pieces reached the vertical position, the air circulating inside the machine stripped the plastic pieces from the screen drum. Two modifications were made to the cleaner to prevent these air currents from stripping the plastic pieces from the screen drum and improve the plastic removal performance. The first was a deflector mounted about 45° from the bottom of the screen drum (fig. 1a). The second was a shroud that covered the front of the screen drum down to about the same place where the deflector was mounted (fig. 1b). The effectiveness of the cleaner with the deflector at removing plastic ranged from similar to slightly less than the unmodified cleaner (fig. 2; 40% with the deflector versus 50% unmodified for the highest airflow setting). With the deflector installed, there was a slight improvement in the amount of seed cotton captured with the plastic (69 lb. per bale with the deflector versus 75 lb. per bale for the unmodified cleaner). With the shroud, plastic removal was similar to that of the unmodified cleaner (fig. 3; 49% versus 50%, respectively, at the highest airflow setting). However, the amount of seed cotton captured with the plastic by the cleaner with the shroud was more than double that of the unmodified cleaner. These modifications did not achieve the objective of the investigation, which was to reduce the amount of seed cotton captured with the plastic while maintaining or improving the plastic removal performance of the cleaner. Future work will build on lessons learned from testing the cleaner. It will focus on laboratory scale for ease of modification and testing and explore techniques that exploit differences in properties of cotton and plastics.

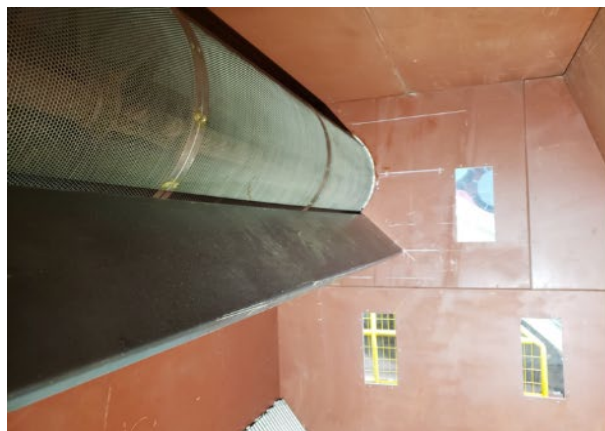
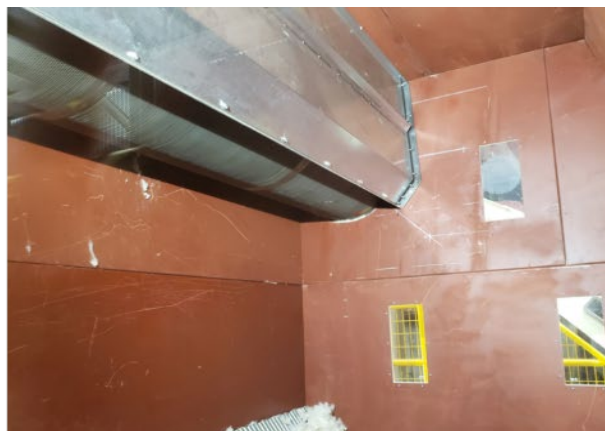
**(a)****(b)**

Figure 1. Deflector (a) and shroud (b) installed in the GoldenLion seed cotton contamination and leaf cleaner to prevent air currents from stripping the plastic pieces from the screen drum and improve the plastic removal performance.

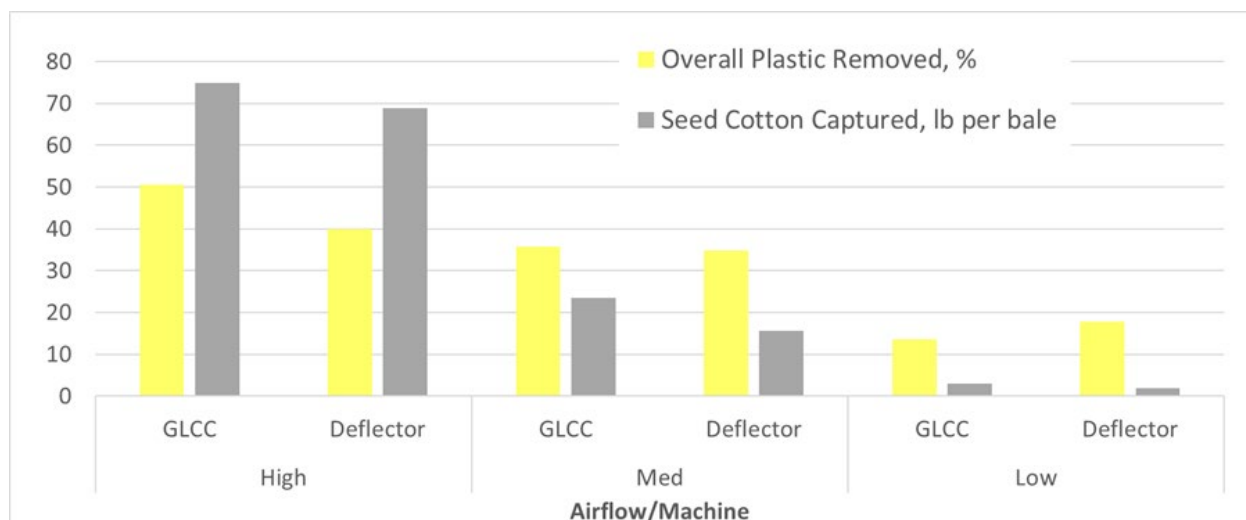


Figure 2. Overall plastic removal performance (%) and amount of seed cotton captured (lb. per bale) with the plastic by the unmodified GoldenLion seed cotton contamination and leaf cleaner (GLCC) and the cleaner with deflector installed for high, medium, and low airflow settings.

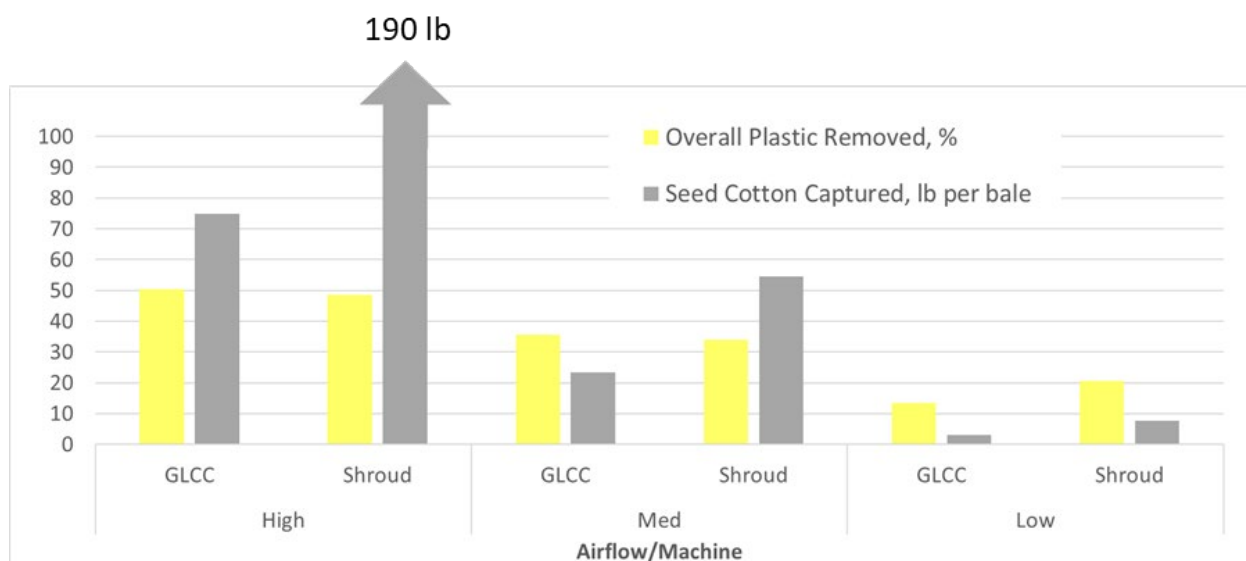


Figure 3. Overall plastic removal performance (%) and amount of seed cotton captured (lb. per bale) with the plastic by the unmodified GoldenLion seed cotton contamination and leaf cleaner (GLCC) and the cleaner with shroud installed for high, medium, and low airflow settings.

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