

Plastic Contamination in Cotton

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From the time cotton was first cultivated for fiber production, extraneous material has been present in cotton fiber. Contaminants are often organic in nature and come from the plant itself, including leaf and bark residues. Soil particles and other unwanted materials are also commonly found in cotton fiber. Some of this extraneous material is still present in the cotton fiber following ginning and can lead to a reduction in quality and impact fiber grades during the classing process. More recently, lint contaminated with plastic has become a serious issue.

The grade of a bale provides important information on the quality of the cotton fiber that mills must consider prior to purchasing. The presence of contamination in a bale can often be an important component of whether a mill decides to purchase a particular bale and the price offered for the purchase. Unlike other extraneous materials, plastic contamination is often randomly located within a bale and can be more difficult to detect. If undetected in the grading process, the potential exists for a bale contaminated with plastic to be unwillingly purchased by a mill.

Many different types of plastic materials pose a risk for contaminating lint and can enter the production stream from a number of stages, from before harvest through the ginning process and storage of bales at warehouses. Some examples of plastic contamination found in mills include grocery bags and plastic mulch. However, the most commonly reported source of plastic contamination in cotton fiber is from plastic bale wrap material. Research indicates that plastic bale wrap contaminating cotton has increased in recent years with the adoption of more modern harvest equipment employing plastic-wrapped round modules. Additional data indicates that while plastic contamination is a problem throughout the cotton belt, some regions have a higher incidence compared with other locations. This regional variability could result in buyers avoiding bales from specific areas where plastic contamination has been more prevalent, which may result in negative economic impacts to these regions.

Economic Importance

Plastic contamination prevention is critical since contaminants greatly impact not only processing of the cotton to thread/yarn, but also the property of finished fabric. Plastic particles in thread can impact appearance, strength, acceptance of colored dyes, and smoothness of the finished fabric. This ultimately limits the potential use of the finished product, along with the potential value of the product, and can result in an overall negative economic impact to the textile mill.

The level of plastic contaminated cotton became such an issue that in 2018, the extraneous matter codes on the Cotton Loan Chart was updated by the USDA Agricultural Marketing Service (AMS) Cotton and Tobacco Program (C&T). Two new extraneous matter codes for samples containing plastic contamination, Plastic Level 1 (Code 71) and Plastic Level 2 (Code 72) were introduced within the codes. These new codes were provided with this description: “Unlike plant-based extraneous matter such as bark, grass or seed coat fragments, plastic extraneous matter is generally not uniformly distributed throughout a plastic-contaminated bale. Therefore, a sample from a plastic-contaminated bale submitted for classification may or may not have plastic extraneous matter present.”

The economic impact from plastic contamination can be difficult to quantify over a large region, but once a region is associated with producing a higher level of contaminated cotton than other regions, the purchase price offered for that region may begin to decrease. Currently, discounts of 0.40¢ per pound of lint have been reported for bales that are contaminated with plastic and the grower bears the burden of the resulting negative economic effects. One example of the economic impact can be viewed by looking at the 2020-2021 loan discount for the plastic contamination, where the discount is -1870 to -2080 points off of loan. This discount is only expected to increase in subsequent years. Additionally, it has been speculated that in the near future, bales classified as being contaminated with plastic may be excluded from the loan program entirely, again putting the burden back on the grower to find a buyer for that particular bale of cotton.

So, what can a cotton producer do? Below is a set of suggested practices which will help minimize the risk of plastic contamination in cotton. It is worth noting that although the grower can help minimize plastic contamination of the cotton through harvest, plastic contamination can be introduced into the cotton following the time cotton is harvested, from when it is picked up to be transported to the gin and throughout the ginning process. Therefore, it is suggested that the grower work with their harvest team and gins to ensure that all parties are diligent in using best management practices to reduce plastic contamination of cotton.

Suggested Producer Best Management Practices to Help Minimize Plastic Contamination

Pre-Harvest

- Visually inspect field margins and interiors as part of routine scouting and work activities, and remove any foreign material as it is found throughout the season.
- Inspect and clean harvest and module transport equipment.
- In areas where there is a high incidence of a cotton field collecting foreign material (adjacent to busy roadways, urban areas, etc.) consider installing some type of permanent or temporary physical barrier to help reduce contaminants from blowing into the field.

Harvest/Field Storage/Transport

- Continuously monitor the crop during harvest for any type of contamination and remove it prior to being collected by the mechanical harvester.
 - In addition, be sure to train all personnel involved in harvesting of the crop to do the same.
- When storing modules in the field, be sure to place them on smooth flat ground. Avoid placing modules on shredded or standing stalks or other areas where module wrap could be punctured

or torn. Module wrap integrity is critical in prevention of plastic contamination as wrap from damaged modules are much more likely to contribute to plastic contamination than modules that have no damage to the wrap.

- If modules will be picked up with a module truck, be sure to stack them on level ground, in tight groups in a straight line to ensure the module truck driver can fit them into the bed of the truck without scraping the side walls of the truck with a module that might not be lined up which could puncture/tear the wrap.
- It is worth pointing out that when comparing modules transported with module trucks to that of flat-bed trailers, it is reported that there appears to be less damage from modules arriving at gin yards from flat-bed trailers than module trucks. Therefore, if you have an option to use either system, choosing flat-bed trailers may prove to be the best option of reducing plastic contamination during transport to the gin yard.

It is not practical to believe that any one person or even group of individuals can prevent or eliminate all plastic contamination in cotton. However, if everyone is conscience of how and where plastic contamination comes from and implements best management practices to minimize contamination, our industry can greatly reduce the frequency and number of contaminated bales of cotton and thus maintain cotton's profitability going moving forward.

For More Information

The National Cotton Council has a wealth of more specific, additional information pertaining to contaminated cotton lint. Please see find this information at [Contamination-Free Cotton](#). In addition, Cotton Incorporated has a great publication that provides an in-depth information list of all the [major contaminants that are found most often in cotton](#). An additional seminar on Plastic Contamination in Cotton hosted by Texas A&M AgriLife Extension Service in Nueces and San Patricio Counties can be viewed on Youtube titled [National Overview of Plastic Contamination in 2021](#).



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