

Aflatoxin-Negative Cottonseeds in Bright, Greenish Yellow Fluorescent Seed Locks

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ABSTRACT

Bright, greenish yellow (BGY) fluorescent locks were removed from an aflatoxin-contaminated sample of lint cotton. Hand ginning of these fluorescent locks yielded 51 seeds, 26 with BGY linters, and 25 with nonfluorescent linters. All seeds were analyzed individually for aflatoxins. Two of the seeds with BGY lint accounted for 99.9% (2.75 μg) of the total aflatoxins. Four other seeds each contained 0.02 μg of total toxins, and all others contained no toxins. Our results show that 88% of the seeds necessarily lost in discarded fluorescent locks would contain no aflatoxins.

Aflatoxin contamination in freshly harvested cotton has been associated with bright, greenish yellow (BGY) fluorescence of locks examined under long wave ultraviolet (UV) light (1). In 1977 we reported on the removal of fluorescent locks from samples of 12 varieties of freshly harvested seed cotton (2). We ginned fluorescent and nonfluorescent locks and determined the aflatoxin content of the composite ginned seed from each sample. Our results indicated that 80-100% (mean 96%) of the aflatoxin contamination was concentrated in seed ginned from locks that exhibited BGY fluorescence. These seed represented 2-9% (mean 6%) of the total seed weight. Even though the locks were highly fluorescent, not all of the ginned seed separated from these locks exhibited linter fluorescence, an observation that prompted us to determine the number of seeds that did not contain aflatoxin in such fluorescent locks. These seeds would necessarily be discarded if fluorescent locks were removed before cottonseed was ginned.

Approximately 1 kg of freshly harvested seed cotton (Deltapine SR-1) was obtained from the University of Arizona Experiment Station, Yuma, AZ. The sample was viewed in UV, and all fluorescent locks were removed, weighed, and ginned in the equipment used by Lee et al. (2). Ginned seed were examined in UV and categorized simply as fluorescent or nonfluorescent. The aflatoxin con-

tent of each seed was determined according to the procedure used by Cucullu et al. (3), a micro method that can detect 0.10, 0.20, and 0.50 μg aflatoxin/g for whole seeds weighing 0.1, 0.05, and 0.02 g, respectively. The weight of all the seeds was between 0.02 and 0.13 g. Results are reported as μg aflatoxin/seed.

Fluorescent locks constituted 7% of the total 1 kg sample; ginning of these fluorescent locks produced 51 cottonseeds. Linters from 26 of these seeds exhibited bright, greenish yellow (BGY) fluorescence; linters from the other 25 did not. Of the 25 nonfluorescent seeds, only 1 contained aflatoxin (0.02 μg); the other seeds contained no toxins. Of the 26 seeds exhibiting BGY fluorescence, 5 contained aflatoxins and no aflatoxins were detected in the rest. Three of the positive seeds each contained 0.02 μg aflatoxin/seed; the other positive seeds contained extremely high levels of the toxins — 8.96 and 18.61 μg aflatoxin/seed. These 2 seeds accounted for 27.65 μg of the aflatoxin in the 51 seeds, or 99.9% of the total aflatoxins in the sample. These 2 seeds represent only 4.9% of the weight of the seeds ginned from fluorescent locks.

Our results show that the relatively simple removal of fluorescent locks before ginning would remove aflatoxin-contaminated seeds. However, ca. 88% of the seed necessarily discarded would contain no aflatoxins.

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REFERENCES

1. Marsh, P.B., and M.E. Simpson, *Plant Dis. Rep.* 52:671 (1968).
2. Lee, L.S., A.F. Cucullu, and W.A. Pons, Jr., *JAOCS* 54:238A (1977).
3. Cucullu, A.F., L.S. Lee, and W.A. Pons, Jr., *Ibid.* 54:235A (1977).

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