Interesting Issues Associated with Varieties and Seed Quality in North Carolina and Virginia over the Past Decade

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INTRODUCTION

The North Carolina and Virginia certified seed production has been fairly stable in the last 10 years fluctuating between 10,000 and 12,000 ha. Seed production is contracted to specialized growers, conditioned at shelling facilities, and sold by regional peanut companies. Seed acres are maintained at a higher level than next years' projected seed demand to account for fluctuations in supply caused by external factors; such as, extreme weather events, commodity prices, crop failures, etc. Seed is produced to a strict set of standards to maintain genetic purity, minimization of seed borne diseases, and to assure high quality seed. Practically all seed-borne issues are discovered early during field inspections or during seed conditioning. 99.9% of these problems are removed from the seed chain. We have very few examples of non-conforming seed lots that made it into the seed supply because the seed system works. In rare instances, these issues are not resolved until post-planting, a summary of these events follows.

Figure 1

Figure 2

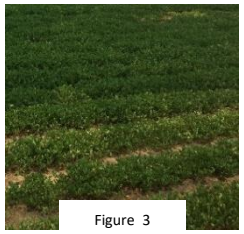

Figure 3

TOP 10 ISSUES

- Excessive foreign matter and poor germination, figures 1 and 2. This seed was improperly conditioned allowing stems, seed of low density, splits and other trash to make it in the seed bag. Additionally, germination was substandard resulting in poor stands and faulty planter performance. Fortunately, this seed never entered the official certified seed chain and was considered an illegal farmer-saved seed transaction. Only growers who used non-certified seed were affected.
- Poor germination of a Foundation Class seed lot, figure 3. Seed lot was traced to specific grower, low germination assumed to be caused by immature harvest and/or poor drying conditions. Foundation Seed supply disrupted but impact to growers was minimal since Foundation Seed programs over produces to account for external factors.
- Poor germination due to drought in 2006. Land plaster was laying on soil surface at harvest. Calcium uptake is dependent on movement into pegging zone and is critical to seed development/quality. Seed from droughty fields was rejected and eliminated from the seed chain.
- Seed was offered for sale in "Brown Bag". Brown bagging is the practice of selling or transferring seed that is illegally labelled, untested, or not produced under strict certification standards. Brown bagged seed is often proven to be unreliable and of inferior quality. Offering non-certified seed for sale without the developers permission and improper labeling is a direct violation of state and federal seed acts. In this case, the peanut company offered their seed for sale without the cooperation of a seed certifying agency and the variety developer leading to a fine and two years probation.
- Low "shell out" at the shelling plants led to reduced supply of high quality seed in 2021. In some cases the shell out was as low as 26%, a normal shell out ranges from 35 to 40%. The low shell out was attributed to excessive moisture at harvest and moisture stratification in drying trailers. The impact to growers was minimal in 2021; however, disruptions to Foundation and Registered Classes may require utilization of emergency recertification procedures in 2022 and 2023.
- The first commercially released high oleic Virginia-type peanut, 'Brantely', lost the high oleic trait and was forced to be withdrawn from the market, figure 4 The cause has never been conclusively determined; although, it is suspected to be caused by outcrossing or a mixture at the seed producer. Elimination of Brantley highlighted the importance of adequate isolation in the field and proper cleanout of harvest equipment, storage bins, and shelling equipment.
- High Oleic trait did not meet variety minimum standards. In 2019, two 'Sullivan' Foundation Class seed lots did not meet the 95% minimum high oleic trait. This issue was found to be a genetic purity issue and not related to maturity at harvest. The root cause is unknown. The questionable seed lots were removed from the seed chain with no impact to the grower.
- The variety 'Gregory' was released with a variant, a bushy off-type, that exceeded certification standards. The breeder and foundation seed were purified and reintroduced to the seed chain. There was no impact to the industry. 'Sullivan' exhibits a variant but at an acceptable rate (<0.01%), figure 5.
- 'Sugg' seed lots exhibited pink (75%) and tan (25%) seed coats, figure 6, in Registered and Certified seed lots. It was suspected that a seed mixture had taken place, potentially at the Foundation level. The impact to growers was indistinguishable since yields were not affected. The breeder provided genetically pure seed to the Foundation Seed program and the suspected mixture was flushed out. Figure 7 is an example of two different varieties comingled with the potential to create a seed mixture if allowed to enter the seed chain.
- When seed is shelled early in the year, November to early January, it often remains dormant during germination testing and may be rejected on the basis of low germination. The seed is actually alive but requires a little time or exposure to warmer temperatures to break dormancy. To remedy this condition, the seed producers store the seed for an additional 4 weeks and re-test. Dormancy is usually broken by early January.

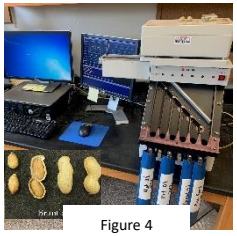

Figure 4

Figure 5

Figure 6

Figure 7

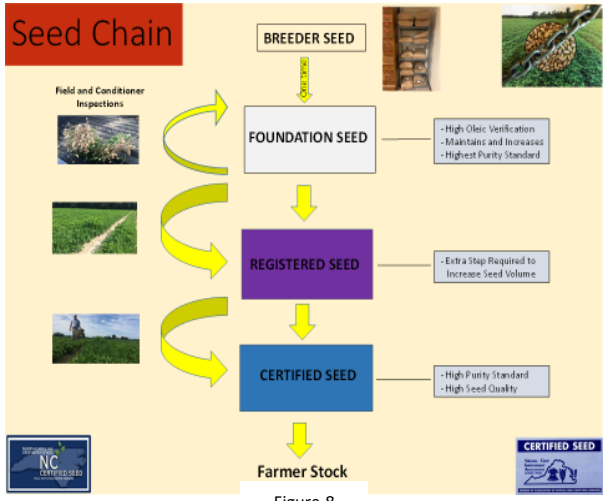

Figure 8

SUMMARY

Peanut seed supply follows the process illustrated in the seed chain, figure 8. Seed Certification is an critical component of the seed chain. The purpose of seed certification is to assure that the seed is produced in a manner to minimize seed-borne problems; such as genetic impurities, seed transmitted diseases, and low germination. Occasionally, mistakes are made or weather events affect seed quality; however, a high percentage of these events are discovered and eliminated from the seed chain before certified seed is purchased by a peanut grower. Most seed failures occur outside the official seed system. The failure rate of the seed system over the last ten years is less than 1 seed lot in 5,000, 0.02%. The seed system used in North Carolina and Virginia is similar to seed systems used throughout the peanut belt and it has been perfected over the last 60 years. The rarity of seed failures and seed complaints to our state Department of Agriculture is proof that the seed supply is predictable, safe, and reliable.