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QUALITY ASSURANCE PROGRAMS - AN OVERVIEW

Charles C. Baskin ^{1/}

Every seedsman or seed company has a quality assurance program. Quality assurance programs vary greatly because of differences among seedsmen in what they want to accomplish. Some seedsmen want only the basic information required for marketing, i.e., germination and purity for labelling purposes. In some cases, this is all a quality assurance program consists of. At the other end of the scale are very sophisticated programs that establish procedures and obtain information for the various stages of producing, harvesting, conditioning, marketing and storage of seed. Each individual situation must be evaluated as to what is needed in terms of a quality control program, and each seedsman must decide what needs to be incorporated into his quality assurance program.

Quality control begins in the field. If you are employing contract growers, it begins with grower selection. You want the best grower available to produce your seed: a grower who will follow recommended agricultural practices for your area; one who is conscientious about what he produces; and who takes pride in doing a good job.

Field selection is extremely important. Seed is a more valuable commodity than grain or forage. So select your most productive fields for seed production. Field selection is also the best way to avoid weed problems. Weed seed are not the only problem but weeds do reduce yields, harvesting efficiency and seed quality. Isolation is another factor that is best considered at field selection time. Know what isolation requirements are necessary for the crop in question and be sure that they can be met when seed fields are selected.

Plant good seed. If you are producing certified seed you are required to plant seed of a specified class. If not, high quality standards are important anyway: seed that are free of weed seed, seed of known genetic origin, that have good germination and vigor, that will produce a desirable stand of vigorous plants. This makes subsequent management decisions much easier. Some one has said that getting a good, clean stand is half of making a crop.

Control weeds. Weeds not only present seed problems but reduce yields and harvesting efficiency. Use a herbicide program that will

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give good weed control. Fertilize adequately. Good fertility is essential to producing high yields of good seed. Some crops require special fertility programs, such as boron for clover seed production. Know what your particular crop requires and provide it.

Other good crop production practices such as insect control should be followed. Application of fungicides during the growing season may be necessary as in the case of soybeans.

About harvest time a quality control program begins to revolve around a testing program. This may be done in your laboratory or some other laboratory.

Harvest carefully. Harvesting is one of the most critical times in the life of a seed. Seed should be harvested as soon as possible after physiological maturity to keep field deterioration to a minimum. Some seed, like corn, are best harvested at high moisture content and dried, others are allowed to dry to a safe storage moisture in the field. Delaying harvest is equivalent to storing seed in the field and rarely are field conditions very good storage conditions.

Mechanical damage is another factor affecting quality that can very easily occur at harvest. Adjustment of combines or other harvesting equipment is critical. Setting equipment only once and making no adjustments for changes in field and crop conditions can result in considerable damage and/or harvest losses. Check grain tanks on combines frequently to know what is taking place and make adjustments accordingly.

Additional mechanical damage can occur in handling. Damage is related to seed moisture content. Desirable seed moisture to minimize problems varies with the species and the number of times seed are handled. The adjustments and type of conveying equipment are also very important. Belts and bucket elevators are generally less damaging than augers. Operating speed, rate of feed and maintenance of the equipment in a good state of repair are as important as the type of equipment used.

If seed are to be dried, drying temperature, rate or speed of drying and amount of drying are factors that must be coordinated to maintain quality.

During harvesting and bulk handling/storage, routine samples should be taken to determine mechanical damage and moisture. There are various methods to determine mechanical damage. One effective, quick easy way is simply visual observation under magnification, if necessary. There are other methods for more detailed evaluation such as fast green for corn and indoxyl acetate for soybeans.

CHART 1

SOME STEPS IN A QUALITY ASSURANCE PROGRAM

Careful selection of growers

Careful selection of production fields

Plant good seed

Follow best cultural practices

Control weeds

Inspect fields periodically

Timely and careful harvesting

Proper aeration and bulk storage

SAMPLE AND TEST

More than adequate conditioning

Treat seed as recommended

Package attractively

SAMPLE AND TEST

Store seeds to maintain quality

Prepare seed for marketing

SAMPLE AND TEST

CHART 2

ESSENTIAL FEATURES OF A QUALITY ASSURANCE PROGRAM

1. Quality standards to be adhered to in company are determined and established.
2. The operational procedures that will be followed to achieve the established standards are promulgated and well known to all workers.
3. A unit or person responsible for quality assurance is appointed and made accountable to highest level of operational management.
4. Systems of inspection and testing are established to assure that operational procedures are being followed and that quality standards are met.
5. Quality problems are identified and appropriate corrective actions are taken or revisions in operational procedures.
6. Effective feedback system is in place.
7. An efficient system for receiving and responding to complaints is well positioned and supported.

Some estimation of viability during this harvesting and receiving period would be highly desirable so that seed that are not acceptable can be eliminated before they go into storage; however, this is not possible in many instances. The cutting test for cottonseed is one of the few tests that permits an estimate of germination in a few minutes.

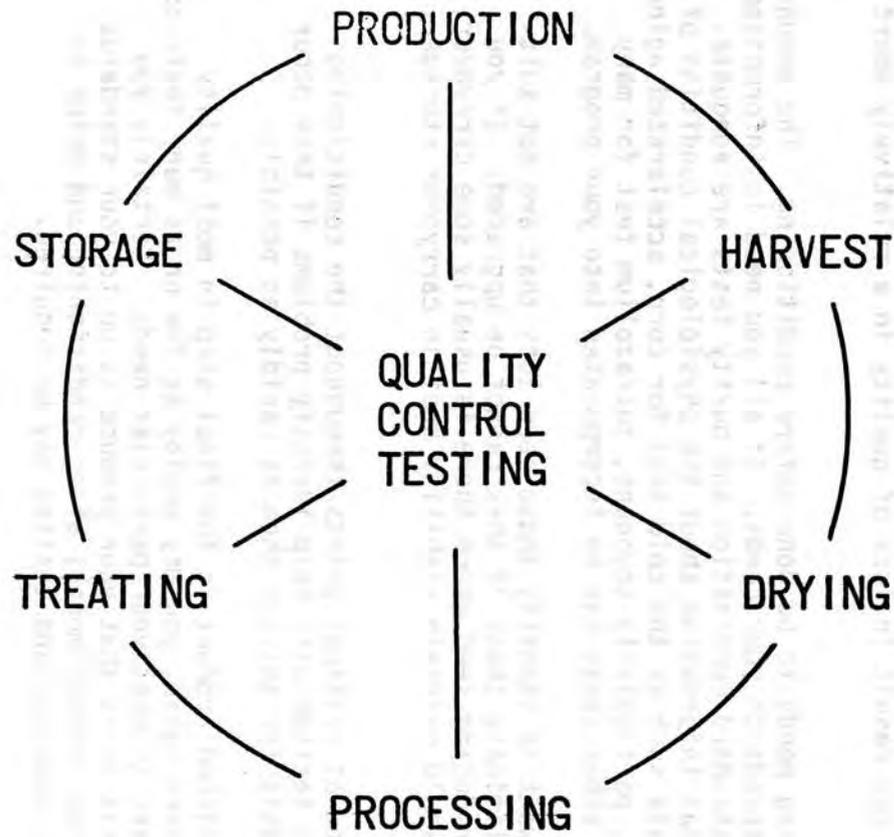
Once seed are harvested, dried as needed, and in storage they should be adjusted to a temperature that is desirable for storage. The quality of most seeds can be maintained quite well at temperatures of 50 to 60 degrees F. Aeration to cool seed and to maintain desirable temperature and moisture content is extremely important. No aeration or inadequate aeration can result in loss of quality in a relatively short period of time.

Extensive testing needs to be done before conditioning. The amount of testing you do depends on your needs. If all you need is information for labelling then standard germination and purity tests are adequate. If you need additional information about the physiological condition of seed lots, other tests such as the cold test for corn, accelerated aging for several species, particularly soybeans, tetrazolium test for many species and several other tests can be incorporated into your program.

Certainly you want to identify those seed lots that are not suitable for sale and eliminate these if they cannot be upgraded. If you are involved with producing seed where there is usually some carryover, knowing which lots would maintain viability best in carryover storage could be invaluable.

Regular sampling at critical points throughout the conditioning sequence and routine testing will help identify problems if they occur and give you some basis for solving them as rapidly as possible.

Testing the finished product is the final step in most quality control programs. Here again, you may employ as few or as many tests as you feel are necessary to meet your particular needs. Certainly you must determine at this point that your produce is up to your standards. If seed are stored for several months after conditioning and prior to shipping, additional sampling and testing may be required.



**THE QUALITY CONTROL LABORATORY IS THE HUB
OF A SEED QUALITY CONTROL PROGRAM**

FIGURE I