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The Farmer's Changing Seed Needs

T. A. Burch

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The purpose of this discussion is two-fold; first, we want to examine how the farmer's seed needs have changed during the last twenty years along with some of the factors which have made change necessary; and second, we want to identify what the farmer's seed needs will be within the next 5 to 10 years in anticipation of changes the seed industry will need to consider in order for the industry to keep pace with needs of tomorrow.

Twenty Years Ago:

For a few minutes let's turn our thoughts back to about 1950. At that time, a serious attempt at putting man into outer space and eventually on the moon was some 10 or 12 years away. There were very few cars with automatic transmissions and practically no color TV sets. Air conditioning was a luxury that was enjoyed in only a very few homes or offices. Very few if any of us had ever heard of Viet Nam, Flip Wilson, Zsa Zsa Gabor and "Curt" Delouche. Hippies hadn't been invented!

Think of agriculture for a moment. In 1950, the Seed Technology Laboratory at Mississippi State University was little more than an idea in the minds of Dr. W. L. Giles and Dr. L. N. Wise, then agronomists, and now President and Vice President respectively of Mississippi State University. In row crop fields, the sight of large groups of hoe hands was common. Except for 2, 4-D, herbicides as we know them today were practically non-existent. Systemic insecticides and some of the fungicides used as seed or soil treatments were not in existence. Almost all of the cotton crop was picked by hand as there were very few mechanical pickers. According to a Louisiana publication, 125 man hours were required to produce and harvest an acre of cotton with two-row tractor power; 145 hours per acre were required with mule power. Today less than ten man hours are needed to produce and harvest the same acre. Similar comparisons could be made with other crops.

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Agricultural technology has changed drastically during the last 20 years. In many crops, production patterns have shifted from those which involve large amounts of hand labor to those that are completely or almost completely mechanized. Equipment has become larger and more sophisticated, and is depended upon on to perform more functions today than ever before. In many instances, plants and/or plant parts can be harvested and handled in such a manner as to inflict mechanical injury. Where planting seed is involved this can result in lower quality seed if careful supervision is not maintained.

Herbicides, insecticides, fungicides and nematocides, many of which were unheard of twenty years aog, are in universal use on farms in the U. S. today. Because of the scarcity and high cost of labor, farmers generally are interested in any practice that will require less labor, yet maintain or increase yields.

Some of these practices have put extra value on the importance of using good seed. For example, twenty years ago, it was a common practice for cotton producers to drill 40 or more pounds of seed per acre when planting their crop. The objective was to obtain a solid row of young plants. The hoe labor that was required for grass and weed control in the drill could also thin the cotton to a desirable stand. As long as this planting system was followed, it made little difference whether the seed was of the highest quality, for many times the amount needed to obtain an acceptable stand was used any way.

In the early to mid-fifties, herbicides became available which offered great promise for weed control, and at lower costs than hoeing. Producers began thinking of the possibility of not hoeing their cotton at all. Such a move, however, would necessitate a change in planting methods so an acceptable number of plants could be obtained per acre without thinning. Thus the practice of dropping seed in hills began. This put an added measure of importance on the quality of seed the farmer used. Since he would not be thinning his cotton, it became more important than ever that he have access to good seed so he could obtain a desirable stand from a much smaller quantity of seed per acre.

Changes in technology within the past 20 years have brought about new methods of pest control, particularly for weeds, insects and diseases. In some crops, the practice of applying one or more materials to the seed for pest control has become common. This is fortunate in some respects, but it can be detrimental under certain conditions. From the farmer's standpoint, the use of seed treatments is a convenient method for applying pesticides. It also assures fairly even distribution of the pesticide(s) in the field. However, application of some of the treatments to certain seed lots can result in injury, thus lessening the chances of obtaining a satisfactory stand.

Again, using cotton as an example, three materials are commonly applied to many of the planting seed. These include a fungicide to control disease organisms in or on the seed itself, another fungicide to help control soil-borne fungi that cause seedling diseases, and a systemic insecticide for early season insect control.

In addition to these treatments the seed are planted in a seedbed that has been treated with one and, in many instances, two preemergence herbicides that may be detrimental to stand establishment under certain conditions--especially those involving high rainfall and/or low soil temperatures. Fertilizer, usually at high rates, has also been applied to the seedbed in which these seed are placed and it can injure germination and emergence when placed too close to the seed. Any one of these individual treatments may not injure seed, but with the possible additive effects of injury from 2 or more treatments there is more likelihood of seed injury. Similar treatments and conditions could also be outlined with other crops.

The chances of injury to the seed from treatments applied either on the seed or in the soil are less if the seed are high in vigor and if the seed coat has not been mechanically injured. As long as each treatment is applied to high quality seed at the proper rate and in the correct manner, seed quality is usually not affected significantly. However, injury to stand establishment can be experienced when seed of lower quality, either lower in vigor or mechanically damaged or both, are used. Unfortunately, many seed that fit in this category find their way through seed treatment machines and into the trade.

Seed quality has changed during the last twenty years. In some crops this change has been for the better. Corn seed generally has improved. An acceptable vigor test for corn has come into wide use and gives a better picture of the true quality of the seed. On the other hand, mechanization of the cottonseed industry has resulted in delayed harvesting, increased weathering of seed in the field and more mecahnical damage. Thus, cottonseed quality has probably declined rather than improved within the past 20 years. Soybean seed have changed little in quality within the past 20 years with one possible exception. Much emphasis has been placed on careful harvesting and handling of soybean seed, and of harvesting at the correct moisture and drying properly after harvest. This may have contributed to some slight improvement in the quality of soybean seed, although the soybean is by no means without its problems.

Genetic improvements have been made in most crops within the last 20 years. Varietal purity has become more important as many crops have come into more specialized production and use. Probably the most reliable measure of such change from the standpoint of genetic purity and laboratory standards is evident in the certified seed programs. With this in mind, current regulations and those in effect about 20 years ago pertaining to certified seed production of some of the major crops in several states were examined. While it is by no means a complete comparison, some of the areas in which changes in regulations have occurred were found to be as follows:

LOUISIANA - SOYBEANS

Item	1947	Current		
		F.	R.	C.[1]
Moonflower (Field)	Not Mentioned	None	3 Plants/ Acre	10 Plants/ Acre
Moonflower (Lab)	Not Mentioned	0	0	0

[1] F = foundation; R = registered; C = certified.

LOUISIANA - RICE

Item	1949	Current		
		F.	R.	C.
Isolation	10'	10' to 1/4 miles depending on adjacent crops and method of seeding.		
Red Rice (Fields)	up to 50 plants/ acre	0	4 plants/ acre	4 plants/ acre
Other Noxious weeds	up to 10 plants/ acre	0	4 plants/ acre	4 plants/ acre
Noxious weeds (Lab)	1 or 2/lb.	0	0	0

LOUISIANA - COTTONSEED

Item	1949	Current F.	Current R.	Current C.
Off-type plants /acre	up to 4% (1000/A)	0	1	5
Purity %	97-98	99	99	99
Cocklebur	Not Mentioned	0	1/2 lbs.	1/lb.

LOUISIANA - WHITE CLOVER

Item	1947	Current F.	Current R.	Current C.
Purity %	97-98	99	99	99
Other crops %	.25-2.0	.02	.25	1.0
Noxious weeds/lb.	up to 360	45	90	180
Dodder & Johnsongrass	Not Separated	0	0	0

NORTH CAROLINA - SOYBEANS

Item	1950	Current F.	Current R.	Current C.
Combine & Seed Cleaner Affidavits (New Growers)	No	Yes	Yes	Yes
Purity %	97	98	98	98
Inert Matter %	3	2	2	2

NORTH CAROLINA - COTTON

Item	1950	Current F.	Current R.	Current C.
Off-Type Plants/Acre	5	0	1	5
Cocklebur (Field)	Not Mentioned	0	0	0
Off-type Staple	.5%	0	0	0
Other Crop Seed (Lab)	up to 3/lb.	0	0	0

ALABAMA - PEANUTS

Item	1950	Current F.	Current R.	Current C.
Farmer Seed(In Hull)				
Pure Seed %	92-96	96	96	96
Germination % (Hand Shelled)	70	85	85	85
Processed Seed				
Pure Seed %	96	97	97	97
Germination % (Machine Shelled)	70-80	75	75	75

ALABAMA - SOYBEANS

Item	1950	Current F.	Current R.	Current C.
Pure Seed %	97	--	98	98
Moisture %	14	12	12	12

ALABAMA - COTTON

Item	1950	Current F.	Current R.	Current C.
Other varieties, plants/acre (Field)	up to 5	0	1	1
Other crops, seed/lb. (Lab)	up to 3	0	0	0
Weed Seed	0	0	0	1 cocklebur per lb.

MISSISSIPPI - SOYBEANS

Item	1951	Current F.	Current R.	Current C.
Other crop plants (Field)	5-10	0	0	2

MISSISSIPPI - CRIMSON CLOVER

Item	1951	Current F.	Current R.	Current C.
Isolation	600-970'	1320	660	600
Other Crops, Plants/Acre	up to 100	permitted if seed are separable		
Pure Seed %	97	98	98	98

MISSISSIPPI - COTTON

Item	1951	Current F.	Current R.	Current C.
Other crop seed	up to 3/lb.	0	0	0
Noxious weed seed	0	0	0	0
Cocklebur	Not mentioned	0	1/2 lbs.	1/2 lbs.

GEORGIA - CRIMSON CLOVER

Item	1948	Current F.	Current R.	Current C.
Isolation	330-990'	1320	660	330
Objectionable Weeds/lb.	up to 90	9	27	54
Noxious Weeds	Not mentioned	None	None	None

GEORGIA - PEANUTS

Item	1948	Current F.	Current R.	Current C.
Other varieties (Field)	up to .5%	1 pl/A	2 pl/A	5 pl/A
Other varieties (Lab)	up to .5%	0	.2%	.2%
Germination %	80 (H)	75(P)	75	5

H = Hand Shelled P = Machine Processed

These changes reflect a general trend toward improvement in genetic purity and laboratory standards. As would be expected, changes were more numerous in some crops than in others. In all probability, crops could also be found where no changes have occurred.

Of the changes in regulations which have occurred, two areas stand out. One is the trend to place stricter limits on the number of generations that can be produced from Breeder or Foundation seed. This has shifted from almost unlimited generation increase in many states to a strictly controlled program. Such a move provides better assurance of varietal purity. The other area concerns contamination of crop seed with noxious weed seed. Seed of some noxious weeds that once were permitted in the laboratory sample are now prohibited. In other instances, the number permitted has been sharply reduced. While there may be room for further improvement in regulations under which the various states operate their certified seed programs, many improvements have been made within the past 20 years and better quality seed are being made available to producers as a result.

A recent development in seed certification involves recognition in the Federal Seed Act of the Foundation, Registered and Certified classes of seed. As a result of this action, any agency certifying seed in the future must adhere to the minimum standards of the Association of Official Seed Certifying Agencies. In certain instances this will result in the production of certified seed of higher genetic purity and improved laboratory standards.

The number of acres certified by the various states is also of interest. Generally, certified acreage has increased. However, decreases can be noted in some instances where the number of acres of a particular crop, such as cotton, has decreased. Acreage certified and percent of crop planted with certified seed now and 20 years ago are shown for several states in tables 1 and 2 for some of the major crops.

The Future:

Production technology will continue to undergo change. Where possible, steps toward more complete mechanization involving less labor input will be made. The use of herbicides, insecticides, fungicides and nematocides will increase, federal regulations permitting. Equipment will increase in size. In all probability the cost of producing and harvesting crops will continue to rise. It will not be surprising if the cost of money needed to produce a crop remains high.

Large increases in the price received for most crops do not seem probable. The net result will be that producers will continue to be caught in a cost-price squeeze.

A situation such as this makes it even more important that high quality seed be made available to producers. They simply cannot afford the luxury of replanting a large percentage of their crops because of low quality seed.

It will become more and more important for the producer to have a dependable measure of the true quality of the seed he is planting. This can only be done through the development and use of tests that give a realistic measure of the inherent vigor of seed. It is strongly felt that the greatest service the seed industry can provide for the producer within the next few years will be to make available dependable vigor rating systems for seed. Specific tests will probably have to be developed for each major crop. As good as it is and as much as it has been used, the standard germination test falls woefully short of giving a true indication of the emergence power of seed.

Table 1. ACREAGE OF CERTAIN CROPS CERTIFIED IN 1950 & 1970 IN SEVERAL STATES.

Crop	Year (Approximate)	Oklahoma	North Carolina	Arkansas	Texas	Mississippi	Louisiana
Cotton	1950	8,111	8,513	84,770	182,739		13,982
	1970	988	12,970	31,401	86,074		8,897
Soybeans	1950	15	1,603	8,913	NONE	5,000	702
	1970	1,035	25,787	110,130	2,133	83,000	59,952
Corn	1950	2,149	5,761				
	1970	40	2,351				
Rice	1950			1,645	9,674		1,609
	1970			16,438	9,496	6,000	18,465

Table 2. ESTIMATES OF THE PERCENT OF CERTAIN CROPS PLANTED WITH CERTIFIED SEED.

Crop	Year	California	Tennessee	North Carolina	Mississippi	Louisiana
Alfalfa	1950	nil				
	1970	50				
Rice	1950	25			nil	5
	1970	90			75	75
Cotton	1950		10	45	35	20
	1970		65	85	40	50
Corn	1950		50			
	1970		1			
Soybeans	1950		5	25	nil	nil
	1970		50	60	70	75
Small Grains	1950			30		
	1970			65		
Grasses	1950			50		
	1970			80		

Dependable vigor rating tests, acceptable to the seed trade and to producers, are not impossible to develop. The seed industry is behind in this field. It's time to make a concerted effort to get such tests developed and in use. In addition to being helpful to producers, vigor tests would be of value to seedsmen in that they would provide assurance of the quality of the seed being sold.

The development and use of vigor tests might result in a different pricing policy for seed of some of the major crops. It is probable that because of additional processing and greater losses through grading it would be necessary to sell seed known to be high in vigor at a higher price than those exhibiting less vigor.

Some members of the seed trade have questioned whether producers will pay extra for high quality seed. While they might resist paying exorbitant prices, there is every reason to believe that producers will pay for higher quality seed if they can be sure they are getting such quality. Except in the case of corn, producers have not had a chance to buy seed of the major crops that have been rated for vigor. Conversations with several producers have indicated their willingness to pay for seed of known high vigor.

As more information is accumulated concerning the most ideal plant populations for crops, precision planting will become more important. For precision planting to be most effective, seed size will have to be defined within closer limits. This is already being done with corn. As planting patterns, row widths, etc. change, (a current example is the interest in narrow-row cotton production) precision sizing of seed may increase in importance. Another possibility for assisting with precision planting of some crops is the use of water soluble tapes. Such a practice would insure precise spacing of seed. It may have most application in the vegetable and flower seed areas, however.

Research on selective treatment of seeds to control weed seed that are mixed with crop seed is underway for certain weed-crop combinations. The objective is to apply an herbicide to seed which will result in control of the seed upon germination, yet not harm the crop seed. Should this type of treatment prove effective and feasible, the seed industry could render a further service to producers by developing a means to apply it. Finally, in this age of advancing technology and specialization seedsmen and agricultural suppliers will profit by seeing to it that their employees stay well informed. An informed employee can render service to customers--whether it be by giving advice on seed quality, by adjusting a sprayer in the field, by helping supply the correct fertilizer needs, or whatever; whereas uninformed employees cannot.

Correspondence we received from one state contained the following statement. "In our state there is grave concern over the situation that allows inexperienced and untrained store helpers, service station operators, etc., to dispense and sell seed under the guise of an authoritative seed dealer." Such situations are not beneficial to the seed industry or producers, and should be corrected.

The seed industry has changed significantly during the last 20 years. In some areas it has met the needs of producers. Work remains to be done in others. In the future it will be necessary for this industry to adapt to changes that occur in agriculture and to strive to provide adequate supplies of seed of predictable quality for producers.

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