

POTATO CERTIFICATION -- CHANGES ARE COMING

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The seed potato industry is in the midst of important changes that began at least a decade ago. We live in a world of dynamic change; the electronic media is constantly bombarding us with new projections on future life styles, buying habits and political movements. Books with titles like Future Shock and Megatrends become best sellers. At times we almost tend to become numb to the sometimes astronomical concepts placed before us. I hope you will not be numb to what I think is one of the most exciting aspects of the potato industry that we have seen unfold for quite awhile -- the revolution in certified seed production! I also hope my certification colleagues will not feel that I am an unfair critic of our industry as I attempt to look at some of the strong and weak parts of the system we work in.

Before we launch into the role of being a futurist let's take a few minutes and look at some of the reasons why seed certification has survived since about 1915. Prior to the introduction of seed potato certification there weren't any standards by which to evaluate seed quality. Varietal identity was uncertain; disease content was usually unknown and seed grades were not yet established. Quite often the seed buyer was truly unable to know what he was buying. The certification system we use, involving visual inspection of seed fields and tubers in storage, was borrowed from Europe and was generally well accepted. Even with somewhat limited knowledge, about many diseases, the inspection efforts effectively eliminated the obviously bad seed lots and identified the acceptable ones. This technique continues to be used today and will continue to be used in the future, however it certainly will not be the mainstay or central part of the seed certification process that has been in the past. Early on, it became apparent that an on-farm system of maintaining disease control in the basic planting stock be developed. A two step system evolved and the words foundation and certified became an accepted part of the seed industry terminology. Tuber unit planting, intensive roguing and tuber indexing methods were used to eliminate visible diseases and off type plants. These techniques are still valuable and should not be arbitrarily abandoned just because we have started using laboratory tested basic seed stocks. However, tissue culture technology has given us the capability, for the first time in potato history, to supply large amounts of pathogen free plants and tubers.

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Each state certification agency has its roots in a statute that endows it with monopolistic authority to conduct its program and determine which seed lots shall carry the label certified. In some cases agencies suffered from the same ills that most bureaucracies have and lost touch with the very people it was created to serve -- in this case the potato grower who purchases certified seed. Very often the agency's relationship with the seed producer was very close but the seed buyer may not have been necessarily regarded a preferred customer! In fact, it is somewhat ironic that a gap of communication between the certified seed industry and the seed buyers existed until quite recently. Special efforts were initiated about 5 years ago on the part of certification officials and seed growers to reach out to their counter parts in the commercial potato industry. The North American Seed Potato Seminar is one example of this effort. The results appear to have been very beneficial and we have today a better sense of understanding than has existed at any time during the past 30 years. Certification agencies have been challenged by seed growers and commercial growers alike. The prevailing attitude among certification officials today reflects a definite awareness that many other things besides the statutory authority on which their programs were founded will dictate the kinds of services that they will be delivering to the potato industry. In spite of some short comings, certification "worked" from the very beginning and can justifiably claim its fair share of the success story associated with American agriculture.

The application of biotechnology -- tissue culture -- to seed potatoes is truly an outstanding achievement. The capacity of this type of propagation along with highly improved disease testing methods, to make available large quantities of totally pathogen free seed has advanced the state of the art enormously! Equally important, however, to the quality of the science involved is the rate of adoption by the seed industry. In a span of about five years the techniques have been taken out of the research labs and translated into production systems operated not only by certification agencies and commercial labs but by many seed growers themselves. The role of commercial tissue culture labs is a new and interesting dimension in the seed industry. The opportunity to provide sophisticated technology on a mass production scale for the seed potato industry is being developed in a very professional way. However, the very rapid development of on-farm labs which are producing very acceptable quality planting stock raises serious questions about the long term market potential for commercial labs. If new production methods, developed by commercial labs succeed in substantially lowering the cost to the seed grower commercial labs may become an important part of the certified seed industry in the coming decades. If not, on-farm labs could easily dominate the picture!

In any event it is significant to note that the active participation of both seed growers and commercial labs in the "cutting edge" of new technology has resulted in a new and very desirable source of leadership for the seed potato industry. These people are successfully operating in areas that historically have been inhabited only by university personnel or other government supported researchers. I regard this as a most proper and positive step in the evolution of seed potatoes -- in spite of the fact that it may challenge the established role of traditional certification leadership.

The limited generation approach to certified seed production has been adopted by many agencies and is likely to become standard by the end of this decade. The limited generation system places a maximum limit on the number of years any given seed lot can be grown until it must be phased out of the program regardless of field readings. The system is technically sound and points out that basis seed stocks that were verified to be totally disease free under laboratory conditions will inevitably become recontaminated with each additional exposure to field conditions. The limited generation concept has gained additional support since we have learned more about some relatively uncontrollable aspects of blackleg spread under field conditions; for example, surface water, insects and wind blown aerosols.

With the advent of limited generation programs certified seed growers must purchase appropriate generation planting stock to qualify. Likewise, many seed buyers of planting stock for commercial acreages are beginning to associate improved performance with earlier generation seed. It seems rather clear that the limited generation system is being recognized as a meaningful way for the seed buyer to better understand certification methods and relate that information to seed quality.

One of the more interesting changes occurring in seed certification is the amount of information on seed lots published in seed directories. Approximately 60% of the agencies now publish limited generation seed class designations for each seed lot. However, only 40% of the agencies include field inspection results -- in most cases confined to leafroll virus and mosaic virus readings. While there has been a trend toward increased publication of field inspection data the move has been very slow. The major reason is fear of misuse of the information by seed buyers. This fear is probably unfounded based upon the experience of states who do publish inspection results. Knowledgeable seed buyers examine inspection records whether or not they are published and many of them attach a genuine measure of integrity to programs where the information is published. In spite of current fears and objections by certain seed growers and certification agencies it appears likely that the trend toward more publication rather than less will continue. As the realization becomes more clearly fixed in the minds of seed buyers that selection of superior performing seed stocks is one of the more important things that they do in their potato production system they will search out those seed sources that offer the most complete background information available.

Recently the proceedings of 1984 International Conference on blackleg (held in Edinburgh, Scotland) were published. This is the first time that scientists and certification officials have met internationally to discuss a single potato disease. I don't want to attempt to summarize the conference here but the very existence of such a meeting merits some comment in a presentation on the future changes in the U.S. seed potato industry. Amazing progress has been made in the last decade on blackleg research. We now know many of the facts that are a prerequisite to formulate control measures. Bear in mind, however, that much remains to be done thus any predictions currently made by anyone could be proven wrong next year or five years down the road.

In spite of this admitted risk, let me attempt to pull together the facts as I see them and speculate about the ability of the seed industry to control this important disease problem.

First, under most seed production conditions of Western United States blackleg is essentially a seed problem. Time and again the overall field performance of stem cut and tissue culture generated stocks verifies this fact. If there is a role of soil survival it is so minimal that it is negligible. Therefore, a clean stocks program established by a seed grower has a high likelihood to drastically reduce the amount of blackleg in the seed sold. The ultimate value and performance of such seed to the buyer -- the commercial grower is highly dependent on his ability to avoid recontamination during shipment, storage and planting. Blackleg like bacterial ring rot is a highly contagious disease.

Let me hasten to add that this may not necessarily explain all aspects of blackleg. High levels of foliage symptoms from which *Erwinia* bacteria have been isolated, are reported in the Pacific Northwest. The source of these bacteria does not seem to be originating from the seed stocks (if clean stocks are planted) but nevertheless a blackleg problem in commercial plantings exists. My main point is that the certified seed grower who utilizes blackleg free planting stock can deliver to his customers seed that contains greatly reduced amounts of blackleg bacteria. If tissue culture technology proceeds on its present course I foresee steadily declining losses from blackleg under most production conditions.

The evidence to date strongly suggest that some seed production areas, those in the driest parts of the country, may achieve the best level of blackleg control. Low humidity, abundant sunshine and irrigation with well water seem to be important environmental factors aiding blackleg suppression.

Additional research to learn more about varietal resistance to blackleg should be vigorously pursued. Also improved methods of sanitation and innovative designs of seed cutters could substantially reduce the rate of recontamination. In cowboy terms "we've got a rope on the critter but we haven't got it cinched down very tight yet".

As we observe the introduction of tissue culture technology into the seed industry it is interesting to speculate about the typical seed grower of 1990 or 1995. I would like to share with you some information that is summarized (in Figures 1-4) from crop reporting statistics and certification data. One of the related questions is -- "What is the approximate balance between the certified acreage approved for seed and the potential seed market?" and "How is this changing". First, let's look at Figure 1 where Fall Crop yield per acre since 1960 is compared to total U.S. potato acreage. These data are prepared on the basis of five year groups of averages. Average yield per acre has risen from about 200 cwt per acre in 1960 to about 319 in 1985. Total U.S. potato acreage has been fairly stable or declined slightly. These data would suggest that somewhat less seed acreage would be needed due to the steadily increasing yield per acre achieved by seed growers.

Figure 2 clearly illustrates this fact. The points on this graph were calculated by assuming a 20 cwt per acre of seed planted multiplied by the total U.S. potato acreage and then dividing the result by the average yield per acre as shown in Figure 1. This is an estimate, to be sure, but it points out a trend -- namely that less total seed acreage should be needed to fulfill the potential market. Now let's look in Figure 3 at the total acreage of certified seed approved. It is obvious that we have maintained a fairly steady acreage during the past 25 years which could indicate a number of things: (1) - perhaps a considerable amount of certified acreage is not really used for seed -- fresh market shipments and processing are the most obvious alternatives. (2) - seed acreage may be grown because it simply provides some growers an additional market option. The extra costs of certification balanced against the opportunity to sell a portion of your crop that you may not sell otherwise is always an attractive thing to consider. (3) - another interpretation that could be offered is that we have seed producers involved who don't really belong in the seed business; they meet minimal standards set by a certification agency but quite frankly the reliability and consistency of the seed does not really merit the label certified seed.

Figure 1. Yield Per Acre - U.S. Fall Crop vs Total U.S. Acreage Planted, 1960-1985.

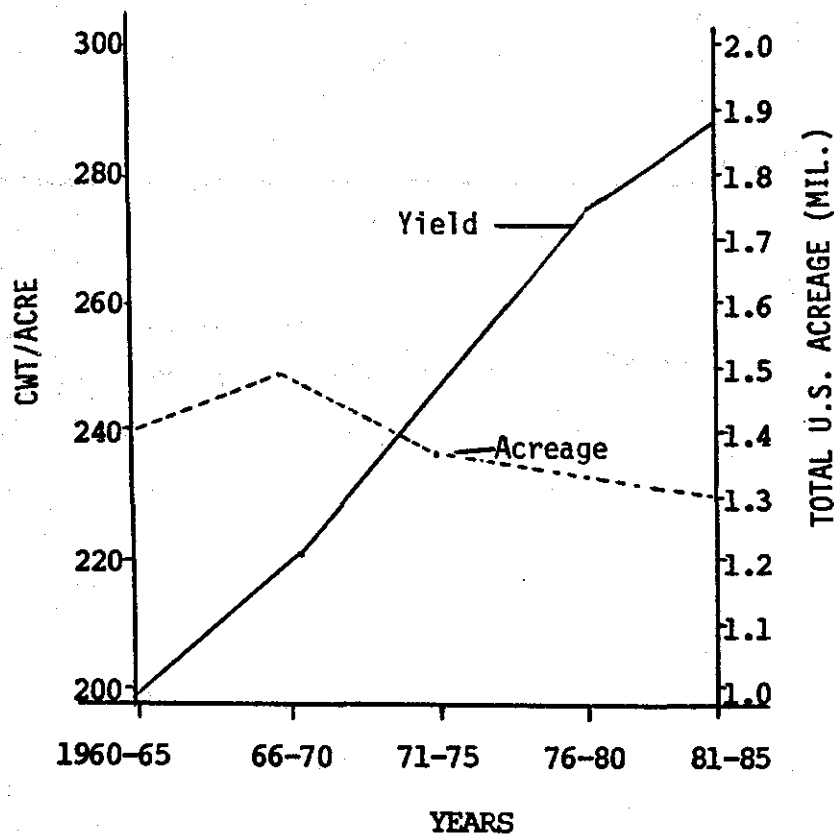


Figure 2. Total Acres of Certified Seed Required - If 100% of U.S. Acreage were Planted, 1960-85.

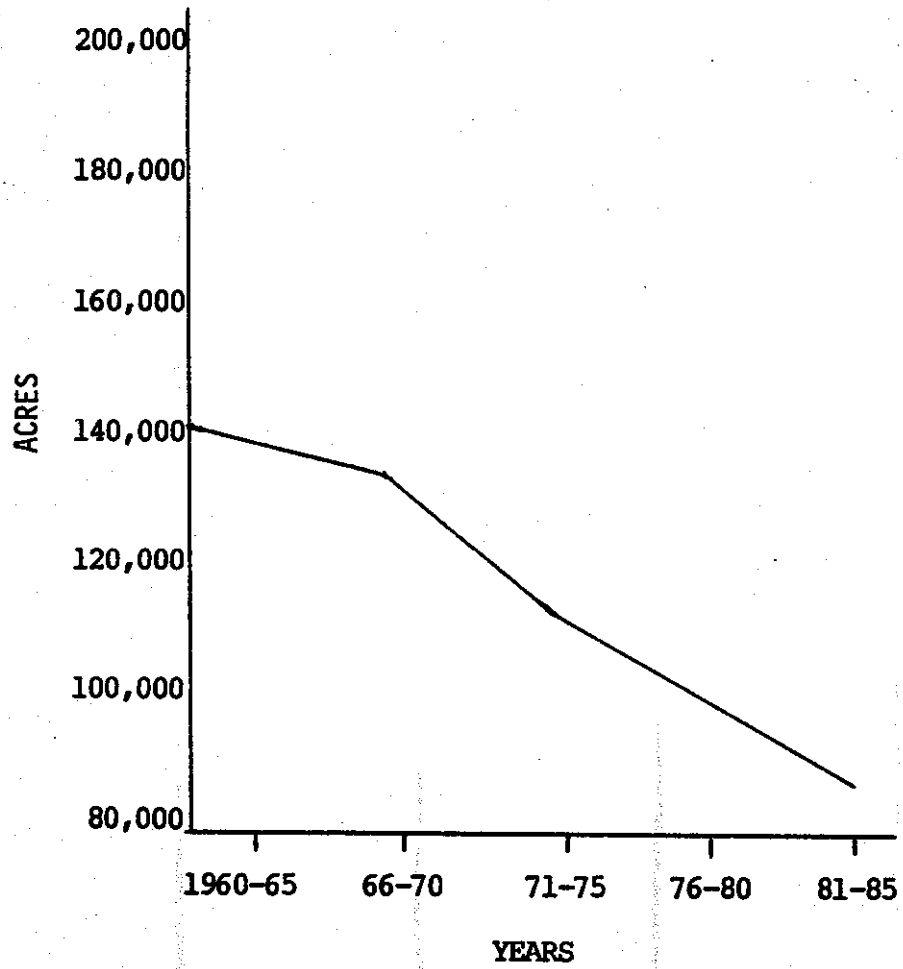
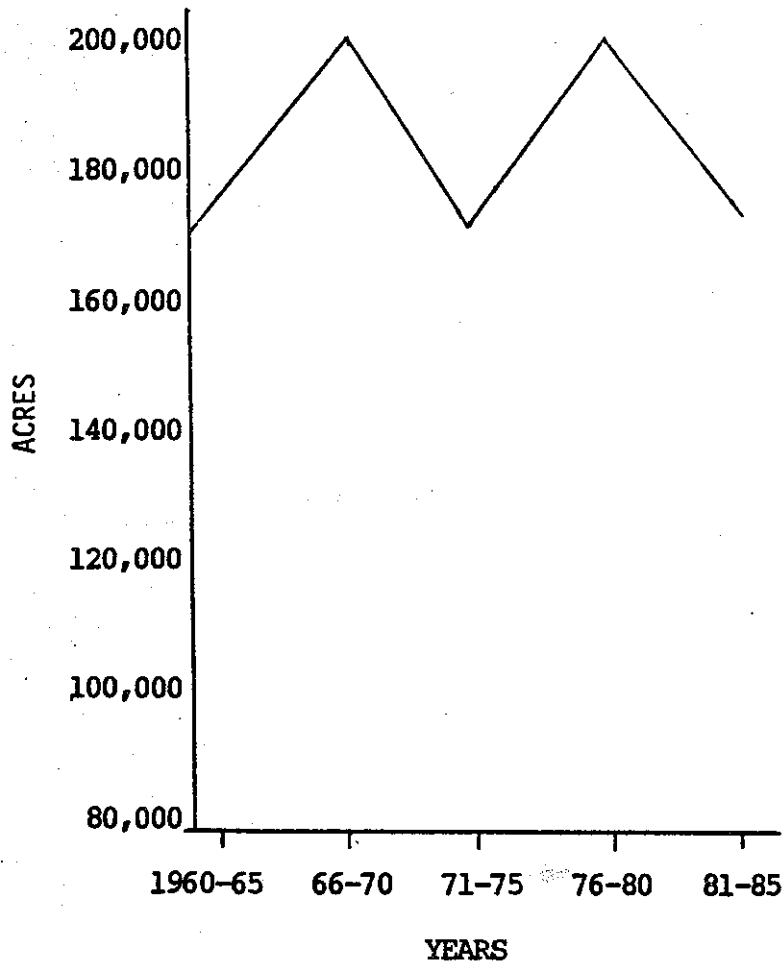
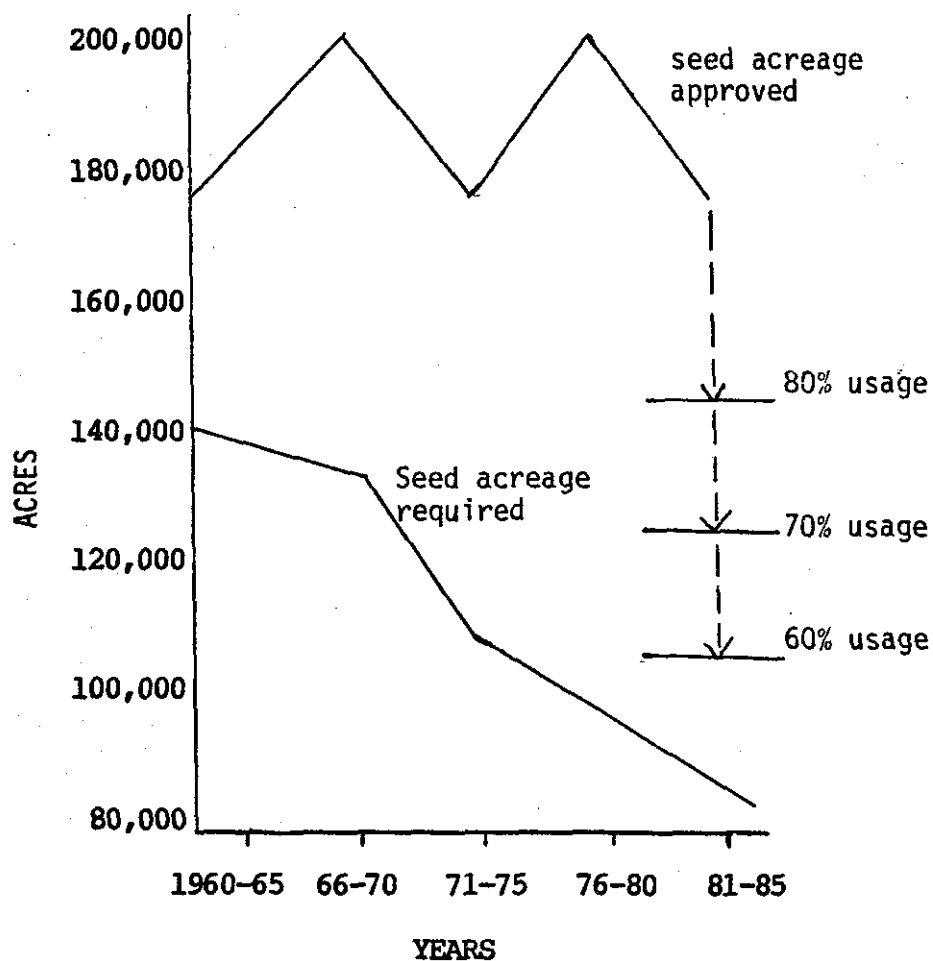


Figure 3. Certified Seed Potato Acreage Approved 1960-1985.



Now let's combine the data in the last two Figures and attempt to make some comparisons. One of the things to keep in mind is that the entire potato acreage in U.S. is not planted to certified seed so the bottom line in Figure 4 should be actually lower than it is. Also remember that it is not possible to use 100% of the seed acreage approved -- there is normal grade out; the large tubers are not suitable for seed and several other factors in seed grades reduce the amount of marketable seed. Let's assume for example that the usage level is either 80%, 70% or 60% of the seed acreage approved. The data still indicates that there is an excess of the amount of seed available and the calculated amount required for the total U.S. acreage.

Figure 4. Certified Acreage vs Estimated Seed Acreage Required to Supply Total U.S. Plantings.



Rather than dwell extensively on what this comparison means at the present time I am more interested in asking "Will this trend continue as sophisticated technology is rapidly being introduced into the seed industry?" My own assessment is that we will see a rather substantial and rapid change in the so called typical seed grower. I think that the market will actually make it too risky for the half-hearted or the less than committed seed grower to be in business. Also, the additional costs that are associated with production of truly superior seed and the extra care and attention to detail which are part of the "new seed programs" will prove to be impractical for a portion of the certified seed growers who have participated in programs during the last 25 years.

Any discussion about changes in the U.S. seed potato industry would not be complete without mentioning the impact of litigation and liability problems that have occurred in the last decade. The trauma and fear associated with court cases has jerked certification officials, advisory boards and growers to a point of attention like nothing else has ever done! We all suddenly became knowledgeable about a host of legal terms that we never knew existed and began to understand something about a document called the Uniform Commercial Code. Every disclaimer cause was thoroughly reviewed and in most cases rewritten to plug some obvious legal holes. Certification officials reviewed their liability insurance and grower members of advisory boards suddenly quit nodding during meetings or letting their attention stray when rules and regulations were being discussed.

So where are we at now -- a decade later? I'll try to portray some of the things we have done in Colorado and in the course of doing that attempt to characterize what I feel is an assessment of the general situation. I make no claims to be a legal authority; this is just a layman's view.

1. We started by revising our disclaimer cause; we discarded about a thousand dollars worth of obsolete tags in 1975 as a result.
2. We have revised our rules at least once a year; sometimes more often to get rid of identifiable sources of liability when they were noticed.
3. Many individual growers have taken errors and omissions insurance; however, currently rates are getting to be excessively high.
4. Advisory board members have insisted that Colorado State University clarify in great detail the type of liability protection the state of Colorado extends to cooperating grower organizations.
5. All advertising responsibility previously done by the certification agency was transferred to the Colorado Certified Potato Growers Assn. to avoid a potential conflict of interest.
6. A rule was passed which says that any potato variety which has an unknown symptom reaction to bacterial ring rot under Colorado conditions will not be eligible for certification until adequate field testing has been conducted.
7. Definite guidelines for field inspectors has been established to require rejection of fields that are not inspectable for any reason such as excess weeds, hail or chemical damage.
8. Written sales arguments are much more commonly used now than a decade ago.
9. Field inspection data are published as a part of the seed directory.

I would like to think that successful implementation of the best technology will greatly minimize the likelihood of legal problems, however, as seed performance improves the expectations of the customers also rises to more idealistic levels. If the certification agencies and seed growers do not properly communicate and accurately represent their product it is possible that a resurgence of litigation could result.

Let me briefly summarize. The certified seed potato industry in the U.S. is being launched into one of the most exciting and productive periods of it's 60-70 year history. The benefits of improved seed quality will provide one of the most significant advancements in improved yield and quality of the last 20-30 years. Many problems remain to be solved -- we are not home free yet! "However, the stage is clearly set and the actors seem to be anxious to get on with the show."