

## WHAT IS POTATO FERTILITY -- TO THE GROWERS?

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Are you expecting another speech on fertilizer? It is true that I manage the Taggares Fertilizer Co.; fertilizer and chemicals are my main interest. But I feel that I have nothing to add to the reports given at this conference by those qualified to do independent research and impartial testing. Nothing to add, that is, as far as a secret way to get better results; a mysterious ingredient that we have found to be the greatest.

Reports and experience to date show that we must use enough fertilizer to more than meet the needs of the crop. Local areas' specific needs have been pinpointed in differing amounts. Certain forms of fertilizer are difficult to control with respect to potato quality. Proper rotation is necessary and, while the argument goes on about banding all fertilizer or splitting fertilizer applications, we are quite happy with three applications per crop for our particular situation. We too are using the results of current testing through research to guide our thinking to potato fertility -- and we suggest that a number of other factors are every bit as important.

The potato grower has as his main objective a profitable product. Yield is not enough, nor quality, nor marketability, nor desirability, nor any one of a number of other adjectives you could apply. If the potato grower cannot make a profit with the best product in the world it matters little what adjective he applies. The potato grower must think in terms of Total Fertility: the best possible environment to produce a profitable product. We are capitalists, we must think of total fertility as much more than applying fertilizer. Some of the factors are: soil management and testing, long range availability of land, water use, weed and insect control, seed quality and sanitation, disease control, nematode control, and marketing. Research is currently being done in most of these fields. An astonishing wealth of information is available to the grower. How the grower takes advantage of this knowledge, and how well it is communicated, determines Total Fertility.

The grower must first take an interest, such as being here today, in assimilating the knowledge from research plots, demonstrations and other projects under way. The answer to your question may already be lying on a shelf somewhere in the form of a report on past research. A perfect example of ignoring knowledge already acquired was seen this year in the high incidence of net necrosis in late potatoes. By failing to follow an insect control program laid down years ago through research, I fell into the trap, along with others, of trying to save a buck by out-guessing the insects, weather and other factors. If the market for fresh potatoes had held, the economic loss to net necrosis would have been serious.

People and institutions engaged in research have an obligation beyond their work to report their findings to the grower in usable forms by such means such as this conference. It is my opinion that our research program is not only adequate in most areas, but outstanding. I think it can safely be used as a base for planning in terms of Total Fertility.

Where, then, are the weak points in our struggle to develop the knowledge we need and put it into practice for Total Fertility? Have you ever been on a tour of the potato plots at the research station? How many? What year? The average field tour of plots attracts many research personnel, fertilizer salesmen and members of the Washington State Potato Commission -- they all have jobs to keep! But the number of growers who attend is pitifully small. Many things can be learned from a tour of plots that are not apparent from the reports you take home from this meeting. You cannot learn to detect potash deficiency symptom from a textbook as well as when a research worker points to a plant which is deficient and another which is not. This is experience -- the best teacher.

You might observe that the fertilizer plot areas are free of weeds. This is because the weeds would so affect the plot data as to make it meaningless. The same applies to insect control. Conclusions can be drawn from these observations and applied to a grower's crop. There is much more affecting the total fertility of the environment than fertilizer.

How many growers are taking full advantage of the answers gained by research -- financed by their own funds? Yes, the person taking least advantage is sometimes the man who pays the bill! How many growers check the reports on local seed testing and the state of origin to see if they have the best seed? This information is available. Is it free? Certainly not; you have already paid for it so why not use it!

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When a critical decision is to be made by the Potato Commission affecting the marketing of potatoes, I wonder how many growers they hear from. Fertility of the market place is essential to a profitable crop, as we know.

You have heard a 3-year summary of soil fumigation studies which contributes to the total fertility of potato growing. Each grower has to determine how limiting the factor of verticillium wilt might be in relation to his particular soil. The most striking thing about these plots was the geometry of the areas of dead vines compared to the healthy ones. Not everyone believes in the statistics which show increases in yield or quality, but dead vines compared to green ones speak for themselves. Also, these studies have turned up side effects from nematocides which may uncover yet another fertility factor.

Nematodes are animals which resemble worms and, unfortunately, feed on root crops. They are present in the Columbia Basin and are becoming an important economic pest. We are fortunate in have excellent

research in progress in this field. This microscopic, relatively unknown, creature could play a part in the total fertility of your potato crop. Archeologists have found evidence that a very advanced civilization in South America may have been wiped out because their agriculture was destroyed by nematodes! Certainly the presence of nematodes should be considered a factor in planning the best possible environment.

The grower then, must be certain that he is aware of the research being done related to potatoes. He must consider the knowledge thus offered him in the light of his special situation. Beyond this, he must necessarily, because of the explosion of knowledge made available, spend more time studying the new facts and evaluating his position in order to come to the best decisions. It is quite possible that the grower can profit more from time spent looking at research plots or discussing current problems in a meeting than from the same number of hours spent on the farm. If, as we have heard recently, farming is a business and the grower is a manager competing with other managers, he cannot afford to fall behind in acquiring the management tools affecting his business climate. And, in applying new tools to the job, he must be willing to make mistakes and adjustments until the practice is adapted to his situation.

What then of those at the other end of the two-way street of communication -- the researchers and institutions engaged in trying and testing, theorizing and agonizing in the search for new facts? I have been fortunate to know many researchers personally and some of their problems. They react most favorable to anyone who shows an interest in their work. Their greatest difficulty is in having to speak from a fixed position (related to your particular problem) while on board a rapidly moving object (expanding research.) To apply the facts they have gained requires cooperative understanding. The researcher must try to understand the aspects of the growers' particular situation and the grower to see the basic elements pointed out by research. It helps to have an intermediary such as the Extension Service with local agents who understand the problems of the farmer and the the research worker. The County Agent can be very effective in interpreting research in practical terms and implementing its adoption by the use of publicity and whatever means indicated.

It should be made clear that basic recommendations by institutions for a given problem are not made by researchers but are administrative decisions based upon research. There is not always enough research being done to anticipate problems which arise. Such was the case of potato residues from soil insecticided which become a problem in 1962. Total Fertility hung in the balance while evidence was weighed as to recommendations for 1963. Potatoes that have to be destroyed because of residues are not very profitable. When we needed more data on these residues, we did not have it and WSU was forced to make a weak recommendation due to special conditions existing in Columbia Basin soils. Grower support for continuous research by the institutions involved can help avoid other cases like this.

Total Fertility, then, to create the best possible environment for production of a profitable crop is many things: but it is mainly bridging the gap between the grower and research by the best means obtainable. Each must recognize that the many factors involved create a fluid situation which can be affected tremendously by progressively expanding research.

While this conference was conceived primarily for researchers to report to the grower, I believe it should also be a sounding board for growers to exchange views on their experience. It should provide opportunity for those in the industry to state their case. For growers and shippers to participate in this conference each year will mean greatly increased communication.