

Thursday, January 22, 2004

TO: Grant Gelineau

RE: Changes in Petiole P Analysis in potato in response to Steric-P and 10-34-0 application in fields near Warden, WA in 2003

I have looked over the petiole analyses you gave me from the potato fields in the Warden, WA region. Your particular questions were about the petiole phosphorus levels and the use of water run Steric-P and 10-34-0 on potato in these fields. Below is a review of the information followed by a short discussion section.

Percent change in petiole nutrient levels shown in Table 1 is calculated as (after-before)/after as percent. So if the before treatment petiole level was 0.33 and the after level 0.52 then the percent change is  $(0.52-0.33)/0.52 = 36.6\%$ .

**FIELD 1:**

Steric-P was applied on 6/18. Petiole P levels on 6/16 were 0.33 and increased to 0.52 on 6/21. Neither nitrogen, nor sulfur, nor potassium increased over the same time period.

10-34-0 was applied on 7/2. Petiole P levels before were 0.28 and after were 0.29. Petiole levels of N decreased and S and K increased slightly.

**FIELD 2:**

Steric-P was added on 6/18. Petiole-P levels on 6/16 were 0.21 and rose to 0.25 on 6/21. There was an increase in N and K but no increase in S.

10-34-0 was applied on 7/2. Petiole P was 0.13 on 6/27 and 0.15 on 7/06. Levels of N, S, and K decreased.

**FIELD 3:**

Steric-P was applied on 6/9. The P petiole levels were 0.36 on 6/6, 0.26 on 6/16 and 0.49 on 6.21. The same pattern of decrease then increase followed by a decrease was seen in N, S, and K.

10-34-0 was applied on 7/2. The petiole P levels on 6/27 were 0.27 and fell to 0.17 by 7/6. During the same time period both nitrogen and potassium levels fell whereas sulfur increased.

**FIELD 4:**

Steric-P was applied on 6/9. Petiole P levels were 0.29 on 6/6 and fell to 0.14 on 6/16. Nitrogen, sulfur and potassium levels all fell during this time. Nutrient levels stabilized for the period between 6/16 and 6/21. Additional Steric-P was added on 6/21. 10-34-0 was applied on 6/28. On 7/6 the petiole levels for N, S, P, and K fell to below critical levels.

**FIELD 5:**

Steric-P was applied on 6/18. Petiole P levels on 6/16 were 0.29 and increased to 0.42 on 6/21. Nitrogen and potassium levels increased and sulfur levels fell during the same period.

10-34-0 was applied on 7/2. Petiole P levels were 0.23 on 6/27 and remained the same on 7/6. However, during this same time the levels of N, S, and K all decreased.

**FIELD 6:**

Steric-P was applied on 6/7. Petiole P levels were 0.18 on 6/6 and rose to the sufficiency level of 0.20 on 6/16 and to 0.23 on 6/21. During the interval from 6/6 to 6/17 the petiole levels of N, S, and K decreased. They decreased even more between 6/16 and 6/21 whereas the P levels increased.

10-34-0 was applied 6/28. On 6/21 the P levels were at 0.23. They fell to 0.20 on 6/30 and fell further to 0.15 on 7/6. Petiole levels of N and K fell during each of the two weeks. S levels increase slightly between 6/21 and 6/30 and then fell by 7/6.

**DISCUSSION**

The percent change after application is shown in Table 1 below.

In fields 1, 2, 5, and 6 the petiole P levels increased within the first week after Steric-P application. In field 3 it increased in the first two weeks post application. Only in field 4 did the P levels drop after Steric-P application. However, this field had serious problems and was below normal in all nutrients measured.

In field 1, 2, and 3 the petiole P levels increased slightly after applications of 10-34-0. They remained the same in field 5 and decreased in both fields 4 and 6.

Field	Fertilizer	P Before	P After	% Change
Field 1	Steric	0.33	0.52	36.5%
	10-34-0	0.28	0.29	3.4%
Field 2	Steric	0.21	0.25	16.0%
	10-34-0	0.13	0.15	13.3%
Field 3	Steric	0.36	0.49	26.5%
	10-34-0	0.17	0.19	10.5%
Field 4	Steric	0.29	0.14	-107.1%
	10-34-0	0.15	0.11	-36.4%
Field 5	Steric	0.29	0.42	31.0%
	10-34-0	0.23	0.23	0.0%
Field 6	Steric	0.18	0.2	10.0%
	10-34-0	0.23	0.2	-15.0%

Table 1. The percent change in petiole P levels within the first week after application with the exception of Steric P in field 3 where the value was the increase over two weeks.

In general, Steric-P was more successful in increasing petiole P levels than were applications of 10-34-0 both in terms of number of fields as well as percent increase in petiole P (Table 1). The data, with the exception of field 4, are shown as a bar graph in Figure 1. However, there are other considerations.

At what stages of growth were the Steric-P and 10-34-0 applied? Were they both applied during active growth or was the 10-34-0 applied as the plants were in active bulking stage. In every case, except field 3, the general levels of all non-P nutrients decreased after the July application of 10-34-0. Why?

It would also be good to know the general overall growth of the plants. Sometimes nutrient levels can decrease because of dilution by plant growth. It is possible that an actively growing plant can be accumulating large quantities of nutrients but the concentration (petiole analysis) will fall. Plant analyses measure concentration, not total accumulated by the plant.

But, we can say confidently from this data that Steric-P caused an increase in petiole P in 5 of the 6 fields within one to two weeks whereas 10-34-0 did so in only 3 fields. Neither Steric-P nor 10-34-0 was successful in the sixth field.

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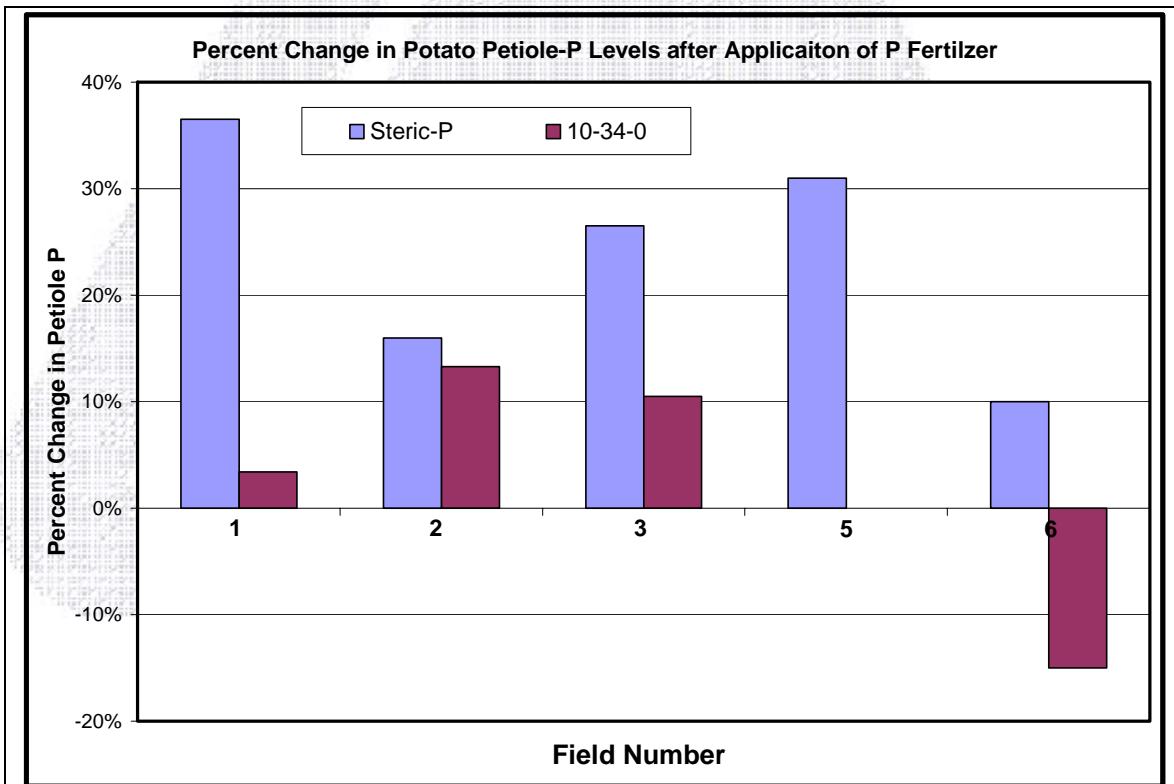


Figure 1. The percent change in potato petiole phosphorus levels as the result of applying Steric-P or 10-34-0 through the water. Data for field 4 is not shown.