

## EFFECT OF MH30 ON RUSSET BURBANK QUALITY

by

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Freshly dug potatoes usually do not sprout. If held in storage at slightly above 40 F potatoes will begin to sprout after several weeks or within a few months, depending on the variety. The higher the temperature the sooner the sprouting begins. Potatoes stored at 38 F can be stored indefinitely without sprouting, but at this temperature the tubers accumulate sugars, become sweet to the taste and produce objectionably dark colored products when deep fat fried. For these reasons potatoes are stored at about 45 F to 50 F, the temperature at which they would normally sprout.

When applied according to the label, MH30 (diethanolamine salt of maleic hydrazide) at one gallon per acre (3 lb maleic hydrazide) has kept potatoes from sprouting even when stored above 40 F. Some reports indicate that potatoes adequately treated with MH30 never sprout; and therefore, MH30 would also prevent the emergence of volunteer potatoes in the field. Unfortunately there are also some reports to the contrary. Some potato growers have maintained that the use of MH30 not only gives good sprout control, but it also improves the quality of the potatoes. Recently some growers and processors have reported detrimental effects from using MH30. Some processors have even barred its use on their contracted potatoes. For these reasons it became important to determine if MH30 had lost its effectiveness or if the conditions of its use in Washington had not as yet been specifically defined. It was suspected that perhaps the recent extensive use of systemic insecticides might have an effect on the performance of MH30. Another suspicion was that the recommended concentrations of MH30 were too low for the high per acre yields of potatoes in Washington. Consequently, five field experiments were conducted. There was a field phase in each experiment. The storage phase has not been completed.

Procedure

There were three large experiments on farmers' fields; they all had the following factors in common.

1. MH30 was applied at 1 gal/acre.
2. Airplane applied MH30 in 10 gal water/acre.
3. Time of application was determined by the manufacturer cooperator.
4. Temik was one of the systemic insecticides.
5. Sprinklers were turned off for 24 hours after MH30 application.
6. One replication was located in each quadrant of the circle.
7. Each plot harvested for data was two rows wide and roughly equal to the radius of the circle in length. All of the potatoes in the small truck loads were weighed and graded.
8. Six samples (about 50 lb) were randomly taken from each truck load of potatoes for specific gravity determinations and storage testing at 38 F and 45 F.
9. Storage and processing results are not yet available.

### Results

The results of the three experiments conducted of farmers' fields are in Tables 1, 2, and 3.

Table 1. Effect of MH30 on the total yield in cwt/acre of Russet Burbank Potatoes, 1977.<sup>1</sup>

Systemics	<u>MH30</u>		<u>No MH30</u>		Mean		Levels of F <sup>2</sup>
	<u>Temik</u>	<u>Other</u>	<u>Temik</u>	<u>Other</u>			
Farm No. 1	419	394	411	369	398b	Farms	***
Farm No. 2	574	558	602	573	577a	Inhibitor	N.S.
Farm No. 3	646	595	623	624	622a	Systemics	*
Mean	546a	516a	545a	522a			
	<u>Temik</u>	<u>Other</u>	<u>Mean</u>				
MH30	546	515	532a				
No MH30	545	522	534a				
Mean	546a	519b					

Table 2. Effect of MH30 on Percent No. 1's Russet Burbank Potatoes, 1977.<sup>1</sup>

Systemics	<u>MH30</u>		<u>No MH30</u>		Mean		Levels of F <sup>2</sup>
	<u>Temik</u>	<u>Other</u>	<u>Temik</u>	<u>Other</u>			
Farm No. 1	72	78	70	78	74a	Farms	***
Farm No. 2	78	79	72	74	76a	Inhibitor	***
Farm No. 3	67	68	52	56	61b	Systemics	***
Mean	72ab	75a	65c	69bc		In X F	***
	<u>Temik</u>	<u>Other</u>	<u>Mean</u>				
MH30	72	75	74a				
No MH30	65	69	67b				
Mean	68a	72b					

<sup>1</sup>Means followed by the same letter are not statistically different at 5% level of significance.

<sup>2</sup>Levels of F: N.S. = non-significant; \* = 5%; \*\* = 1%; and \*\*\* = 1/2%.

Table 3. Effect of MH30 on Specific Gravity of Russet Burbank Potatoes in 1977. <sup>1</sup>

Systemics	MH30		No MH30		Mean	Levels of F <sup>2</sup>
	Temik	Other	Temik	Other		
Farm No. 1	1.074	1.074	1.073	1.071	1.073b	Farms ***
Farm No. 2	1.084	1.084	1.081	1.085	1.084a	Inhibitors *
Farm No. 3	1.080	1.080	1.078	1.082	1.080a	Systemics N.S.
Mean	1.079a	1.079a	1.077a	1.079a		
	Temik	Other	Mean			
MH30	1.079	1.079	1.079a			
No MH30	1.077	1.079	1.078b			
Mean	1.078a	1.079a				

Another experiment was conducted on the WSU Royal Slope Experimental Farm. Some additional variables were included in the study. MH30 was applied at three rates both in the evening and in the morning and under conditions of mild moisture stress. The results are in Tables 4, 5, and 6.

Table 4. Effect of Rate, Time and Application and Moisture Stress on the Yield in cwt/acre of Russet Burbank Potatoes to MH30, 1977. <sup>1</sup>

Rate	A.M.		P.M.		Mean	Level of F <sup>2</sup>
	Wet	Dry	Wet	Dry		
0	547	479	494	496	504a	Rate N.S.
1.0	446	529	523	490	497a	Time N.S.
1.5	459	463	457	472	463b	Moisture N.S.
2.0	416	445	457	492	452b	
Mean	467a	479b	483b	488b		
	Wet	Dry	Mean			
A.M.	467	479	473a			
P.M.	483	488	486a			
Mean	475a	484a				

<sup>1</sup>Means followed by the same letter are not statistically different at 5% level of significance.

<sup>2</sup>Levels of F: N.S. = non-significant; \* = 5%; \*\* = 1%; and \*\*\* = 1/2%.

Table 5. Effect of Rate, Time and Application and Moisture Stress on the Percent No. 1's of Russet Burbank Potatoes to MH30, 1977. <sup>1</sup>

gal/a	A.M.		P.M.		Mean	Level of F <sup>2</sup>	
	Wet	Dry	Wet	Dry			
0	36	44	29	40	37a	Rate	***
1.0	62	50	49	56	54b	Time	N.S.
1.5	63	57	52	58	58b	Moisture	N.S.
2.0	57	51	59	59	56b		
Mean	54a	50a	47a	53a			
	Wet	Dry	Mean				
A.M.	54	50	52a				
P.M.	47	53	50a				
Mean	50a	52a					

Table 6. Effect of Rate, Time and Application and Moisture Stress on the Specific Gravity of Russet Burbank Potatoes to MH30, 1977. <sup>1</sup>

gal/a	A.M.		P.M.		Mean	Level of F <sup>2</sup>	
	Wet	Dry	Wet	Dry			
0	1.072	1.074	1.073	1.075	1.074a	Rate	N.S.
1.0	1.073	1.076	1.075	1.075	1.075a	Time	N.S.
1.5	1.075	1.075	1.076	1.072	1.074a	Moisture	N.S.
2.0	1.072	1.075	1.073	1.073	1.073a		
Mean	1.073a	1.075a	1.074a	1.074a			
	Wet	Dry	Mean				
A.M.	1.073	1.075	1.074a				
P.M.	1.074	1.074	1.074a				
Mean	1.074a	1.074a					

<sup>1</sup>Means followed by the same letter are not statistically different at 5% level of significance.

<sup>2</sup>Levels of F: N.S. = non-significant; \* = 5%; \*\* = 1%; and \*\*\* = ½%.

None of the factors included in the study caused a statistically significant effect on total yield of potatoes. However, there is a trend for potatoes to decrease as the rate of MH30 applied increased above the recommended rate. At the highest rate of MH30, the potato foliage was distorted, particularly on the moisture stressed plants.

A third kind of experiment was conducted on the WSU Othello Experiment Station to test the effect of adding a wetting agent to the MH30. The effect on yield, grade and specific gravity of the potatoes is shown in Tables 7, 8, and 9.

Table 7. The Effect of Adding a Wetting Agent to MH30 on Total Yield in cwt/acre of Russet Burbank Potatoes, 1977. <sup>1</sup>

<u>Total Yield cwt/acre</u>		<u>Level of F<sup>2</sup></u>	
Check	414a		
MH30 + X-77	437b	Treatment	N.S.
MH30	440b		

Duncan's Multiple Range Test

Table 8. The Effect of Adding a Wetting Agent to MH30 on Percent No. 1's of Russet Burbank Potatoes, 1977. <sup>1</sup>

<u>Percent 1's</u>		<u>Level of F<sup>2</sup></u>	
Check	64a		
MH30 + X-77	72a	Treatment	N.S.
MH30	73a		

Table 9. The Effect of Adding a Wetting Agent to MH30 on Specific Gravity of Russet Burbank Potatoes, 1977. <sup>1</sup>

<u>Specific Gravity</u>		<u>Level of F<sup>2</sup></u>	
Check	1.074a		
MH30 + X-77	1.076a	Treatment	N.S.
MH30	1.075a		

The data indicate a non-significant increase in yield, a large increase in percentage grade, and a non-significant increase in specific gravity as a result of using MH30. However, there was no reasonable effect caused by adding X-77.

<sup>1</sup> Means followed by the same letter are not statistically different at 5% level of significance.

<sup>2</sup> Levels of F: N.S. = non-significant at the 5% level.

#### Conclusions

1. The effect of MH30 on total yield in all of the experiments was in agreement with most of the published results. That is, when used according to label recommendations, a reduction in yield of potatoes is not likely to occur.

2. The effect of MH30 on percentage grade in all experiments tended to appreciably improve the percentage grade of No. 1 potatoes, as reported by farmers who have used it for sprout control.
3. The effect of MH30 on specific gravity in all the experiments was in agreement with most published results. Namely, when used according to label recommendations, the effect is minimal on potatoes.
4. Vine symptoms resembling those of herbicidal damage occurred most severely at the higher rates when the plants were in a moisture stressed condition.
5. The effect of MH30 on storage losses, sprouting, and sugar development are incomplete as of this report.