DATE: November 9, 1995

A PROGRESS REPORT OF THE 1994 - 1995 M-P-A WT™ TREATMENT TO DRY LAND WINTER WHEAT. (PLANTER BAND)

TITLE: ***Effect of M-P-A WT™, a combination of humic acid, bio-growth stimulants & micro nutrient fertilization, on yield, quality, and nutrient utilization of dry land winter wheat. (Planter Band)***

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SIGNIFICANT ACCOMPLISHMENTS:

Field plot work completed for year 2 of 3. All data except mineral concentration and plant uptake analyzed.

FUNDING HISTORY:

Year Initiated: 1993
Funding for 1994 - 1995 this donor: $2,500

OBJECTIVE: To evaluate if the addition of M-P-A WT™, a blend of micro-nutrients and plant growth stimulants, affects the yield of wheat when applied with ammonium poly-phosphate, commonly called "10-34-0", by the method of banding at planting time via injecting 1.5 inches below the seed.

INTRODUCTION

The soils in dryland wheat producing areas of the Pacific Northwest tend to be alkaline. Soil pH if often between pH 8.0 and 9.0. They also contain high levels of calcium and magnesium carbonates. Because of the high calcium levels, it is often difficult to maintain sufficient levels of soluble phosphorus. Wheat growers have found that by injecting liquid phosphorus fertilizers, such as 10-34-0, below the wheat seed at planting that the phosphorus level in the plant stays higher. Even so, much of the phosphorus becomes unavailable to the plant. M-P-A WT™ was designed to be added to liquid phosphorus fertilizers to help extend the availability of phosphorus to the plant.

EXPERIMENTAL DESIGN

DESCRIPTION OF TEST PLOT

- Location: T 24 N. R37 E. Sec 32, seven miles south of Davenport in the county of Lincoln, Washington State.
- Total Field size: 124 acres
- Crop: Winter Wheat Variety: Eltan
- Date of Seeding: September 15, 1994
- Seeding Rate: 56 pounds/acre
- Weather Conditions at Planting:
    - Air temperature was 86º F
    - Wind direction & Speed - N. 4-5
- Soil:
    - Sandy loam – appeared uniform throughout test area.
    - Soil Temperature was 72º
    - Soil Moisture was below normal.
    - No rock outcroppings in the field.
- Average Rain Fall for this topographical region: 14 -16 inches.
- Actual Rainfall for 1994 crop: 9.73 inches. *(below average)
- Study was in the middle of a drought. Previous crop year had 9.8 inches of moisture.
- Tillage: Minimum tillage
- Topography: Rolling hills – appeared uniform throughout test area.

PLOT DESIGN

The test field was divided into two ten-acre plots, one for the Control and the other for the M-P-A treatment.

DESCRIPTION OF TEST AREAS

	NORTH	
TOTAL TEST AREA 20 ACRES	TREATED – 10 ACRES	PLOT (A)
	CONTROL - 10 ACRES	PLOT (B)
	SOUTH	

The field was divided from East to West for ease of application and harvesting plots for the grower. It was also thought that this design would not introduce significant extraneous variables in the trial.

TREATMENTS

Plot No:	Treatment/Control	Independent Variables
Plot A	TREATED	1) Three Quarts M-P-A WT™ per acre
Plot B	CONTROL	1) No M-P-A WT™.
Plots A & B	Both Treated & Control	1) 10 pounds of Phosphate per acre using 10-34-0. 2) 7 pounds of Sulfur per acre using 9-0-0-10. 3) 5 pounds of Nitrogen per acre using 20-0-0 (Urea)

Pesticides were used on all plots. These included: One half pint of Buctril by Rhone - Poulenc, 3/10 of an ounce of Finesse by Dupont, and one quart per 100/g of Spreader 90 by United Agri Products.

Prior to seeding, the grower fertilized using a cultiweeder and applied 30 pounds of nitrogen and 6 pounds of sulfur per acre using aqua ammonia and thiosul.

THE EVALUATED VARIABLES WERE:

1. Root Mass
2. Tiller number
3. Grain color
4. Yield
5. Test Weight (kernel weight)

APPARATUS

1. **Great Plains 14-inch wheat drills**
   a. Spacing 14 inches
   b. Depth: 3 inches
   c. Speed: 3.5
   d. Volume/acre: 10 gallons

2. **Harvester**
   a. International 1480.

3. **Injection Pump**
   a. Type of pump was a Hydraulic-Centrifugal.
   b. Flow divider was a Red Ball system.
   c. Type of hose size was one inch with a 3/4 I.D.
   d. Placement tubes were spaced 14" at every opening on planter drill.

4. **Pak Tank - The holding vessel for the solutions used for treatment.**
   a. The type of tank used was a Raven™.
   b. It was a 500 gallon capacity.
   c. The tank was placed on the planter (drills).
   d. The vessel had constant agitation via a by-pass valve from the pump.

RESULTS

YIELDS:

The data are shown below in Figure 1.

Plot (A) TREATED — Three 1/10th acre sub-samples were measured and cut out of the 10 acre **treated** plot. See Treatments on page 3 for details.

	Yield: bu/ac
Sub-Sample 1	62.46
Sub-Sample 2	63.91
Sub-Sample 3	58.76
Mean of Treated Plants >>	**61.71**

Plot (B) CONTROL — Three 1/10th acre sub-samples were measured and cut out of the 10 acre **control** plot. See Treatments on page 3 for details

	Yield: bu/ac
Sub-Sample 1	46.69
Sub-Sample 2	39.71
Sub-Sample 3	45.04
Mean of Control Plants >>	**43.81**

The yield difference between the treated versus the control was 17.90 bushels of wheat per acre.

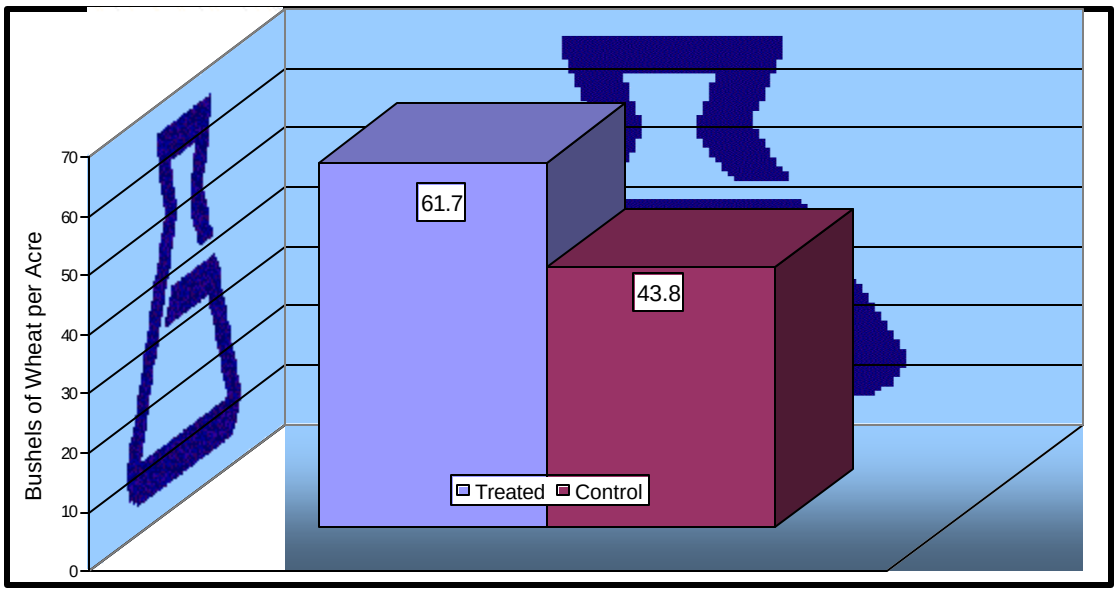

Figure 1 The average yields, in bushels of wheat per acre, of the control and treated plots. The values are the averages of three subsamples. The treated plants received three quarts of M-P-A WT™ per acre added to the regular planting-time fertility program.

ROOT MASS:

No empirical data was collected for either treatment. However, the root mass was visually examined several times during the season. The roots of treated plants appeared to have both more total root mass and more fine roots than the control plants.

TILLER NUMBER

The number of tillers was counted at stooling on June 2, 1994. Three sites were randomly chosen in each of the control and treatment plots. Twenty (20) plants were chosen at each location.

Treated (Plot A): Average number of tillers = 5.4. [1].
Control (Plot B): Average number of tillers = 4.1.

COLOR DIFFERENCES IN FOLIAGE:

The control and treated plots were evaluated visually several times over the season. The treated plants were consistently darker green than the untreated plants.

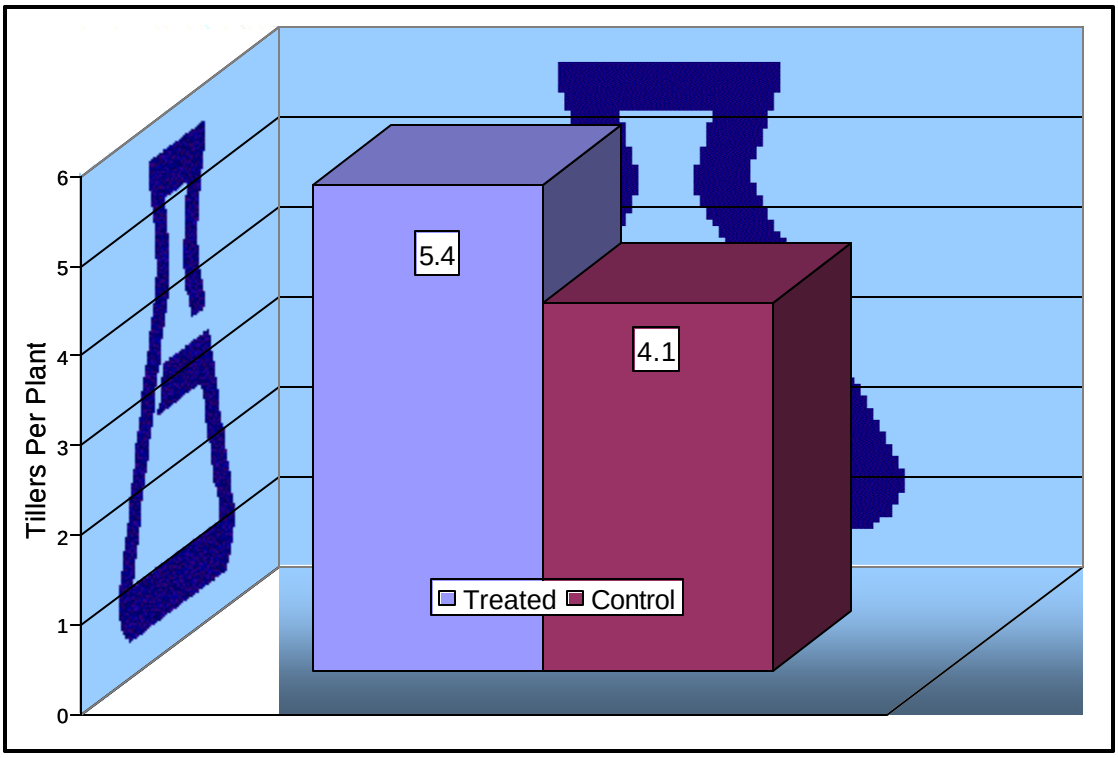

Figure 2. Differences in average number of tillers per plant. Treated received three (3) quarts of MPA WT™ per acre whereas the Control received none.

[1] The treated grain was observed to germinate faster than the control

TEST WEIGHT:

Test weights for both plot's A & B both determined. Both plots were graded as number 1.

DISCUSSION

The wheat plants in the treated areas emerged more quickly than those in the control areas. At mid-season, the number of tillers per plant in the M-P-A WT™ treated areas was greater than on the control plants. In addition, the yields of M-P-A WT™ treated plants were significantly higher (P=0.001). There was no difference in grain quality.

Therefore, the application of M-P-A WT™ blended with liquid phosphorus fertilizer (10-34-0) as a planter band resulted in a significantly greater yield without any loss of quality.