Fertoz

Improve Organic Production with Fertoz Rock Phosphate

"A 35.8% YIELD INCREASE WAS CALCULATED FROM 95 TREATMENT COMPARISONS"

Phosphorus plays a vital role in plant health; strengthening stems, improving resistance to pests and diseases and promoting fruiting and flowering. In organic farming, phosphorus deficiency is a major concern due to continual removal through harvest. Phosphorus originates from rock and is easily tied up and rendered unavailable in the soil. To ensure continual phosphorus availability, off-farm sources are required.

Fertoz Rock Phosphate is approved for use in organic production systems and serves as a natural and highly effective solution for common phosphorus deficiencies in organic crop production. Not only are phosphorus deficiencies corrected using rock phosphate, improved yields are documented through research. The majority of studies reviewed show a statistically significant increase in yield from rock phosphate application. The average yield benefit from RP over all treatment comparisons was 35.8%. This analysis only considers the benefits from rock phosphate alone; however there is evidence of additional crop yield benefits in soils amended with sulphur, beneficial microorganisms, manure and compost.

Percent Benefit in Yield Calculation:

$$Yield\ Benefit\ (\%) = \frac{PR\ treatment\ yield - control\ treatment\ yield}{control\ treatment\ yield}\ x\ 100$$

Table 1. Yield benefit through application of Rock Phosphorus summarized from pier reviewed articles. Summarized yields were obtained from Rock Phosphate treatments vs. no Rock Phosphate (untreated).

CROP	UNTREATED YIELD	RP TREATED YIELD	% BENEFIT	REF CODE
Spring Wheat*	3.7 T/ha	4.4 T/ha	18.9	10
Spring Wheat	1900 kg/ha	1950 kg/ha	2.63	7
Corn*	4250 kg/ha	6000 kg/ha	41.18	7
Spring Wheat	3.8 T/ha	4.1 T/ha	7.89	12
Spring Wheat	3.2 T/ha	3.6 T/ha	12.5	12
Spring Wheat	3.6 T/ha	3.8 T/ha	5.56	12
Corn	102 bu/ac	117 bu/ac	14.71	3
Corn	102 bu/ac	124bu/ac	21.57	3
Oats	52 bu/ac	58 bu/ac	11.54	3
Oats	52 bu/ac	62 bu/ac	19.23	3
Sword Bean*	11.66 g/pot	31.66 g/pot	171.53	1
Sword Bean*	11.66 g/pot	30.66 g/pot	162.95	1
Sword Bean*	11.66 g/pot	38.66 g/pot	231.56	1
Corn*	5.66 T/ha	6.55 T/ha	15.72	6
Wheat	3.85 T/ha	4.27 T/ha	10.91	6
Potato*	22.7 Mg/ha	26.1 Mg/ha	14.98	13
Potato*	22.7 Mg/ha	26.8 Mg/ha	18.06	13
Potato*	22.7 Mg/ha	28.6 Mg/ha	25.99	13
Potato*	26.7 Mg/ha	27.2 Mg/ha	1.87	13
Potato*	26.7 Mg/ha	27.2 Mg/ha	1.87	13
Potato*	26.7 Mg/ha	27.5 Mg/ha	2.30	13
Potato*	22.6 Mg/ha	23.8 Mg/ha	5.31	13
Potato*	22.6 Mg/ha	25.6 Mg/ha	13.27	13
Potato*	22.6 Mg/ha	26.6 Mg/ha	17.70	13
Rice*	5.8 Mg/ha	6.0 Mg/ha	3.45	13
Rice*	5.8 Mg/ha	6.2 Mg/ha	6.90	13
Rice*	5.8 Mg/ha	6.7 Mg/ha	15.52	13
Rice*	5.0 Mg/ha	5.2 Mg/ha	4.00	13
Rice*	5.0 Mg/ha	5.5 Mg/ha	7.00	13
Rice*	5.0 Mg/ha	57 Mg/ha	14.00	13
Rice*	5.4 Mg/ha	5.6 Mg/ha	3.70	13
Rice*	5.4 Mg/ha	5.9 Mg/ha	9.26	13
Rice*	5.4 Mg/ha	5.9 Mg/ha	9.26	13
Mung Bean*	0.5 Mg/ha	0.5 Mg/ha	0	13

Mung Bean*	0.5 Mg/ha	0.6 Mg/ha	20	13
Mung Bean*	0.5 Mg/ha	0.8 Mg/ha	60	13
Mung Bean*	0.7 Mg/ha	0.8 Mg/ha	14.29	13
Mung Bean*	0.7 Mg/ha	0.9 Mg/ha	28.29	13
Mung Bean*	0.7 Mg/ha	1.1 Mg/ha	57.14	13
Mung Bean*	0.6 Mg/ha	0.8 Mg/ha	33.33	13
Mung Bean*	0.6 Mg/ha	0.9 Mg/ha	50	13
Mung Bean*	0.6 Mg/ha	1.0 Mg/ha	66.67	13
Amaranth*	574.4 kg/ha	1612.8 kg/ha	180.64	11
Amaranth*	574.4 kg/ha	1602.4 kg/ha	178.97	11
Amaranth*	763.2 kg/ha	2033.6 kg/ha	166.46	11
Amaranth*	763.2 kg/ha	1976 kg/ha	158.91	11
Potato	6.86 T/ha	7.5 T/ha	9.33	5
Potato	8.67 T/ha	9.3 T/ha	7.27	5
Potato	9.65 T/ha	10.56 T/ha	9.43	5
Cow Peas*	1448.5 kg/ha	2047.7 kg/ha	41.37	2
Cow Peas*	1448.5 kg/ha	2166.3 kg/ha	49.55	2
Cow Peas*	1448.5 kg/ha	2196.2 kg/ha	51.62	2
Cow Peas*	1814.3 kg/ha	2774.2 kg/ha	52.91	2
Cow Peas*	1814.3 kg/ha	2752.2 kg/ha	51.69	2
Cow Peas*	1814.3 kg/ha	2765.6 kg/ha	52.43	2
Potato*	4.62 T/ha	7.5 T/ha	62.34	5
Potato*	4.62 T/ha	9.3 T/ha	101.30	5
Potato*	4.62 T/ha	10.56 T/ha	128.57	5
Corn*	5618 kg/ha	5688 kg/ha	1.25	4
Corn*	5618 kg/ha	5975 kg/ha	6.35	4
Corn*	5618 kg/ha	6152 kg/ha	9.50	4
Corn*	5618 kg/ha	6298 kg/ha	12.1	4
Corn*	4741 kg/ha	4865 kg/ha	2.62	4
Corn*	4741 kg/ha	5074 kg/ha	7.02	4
Corn*	4741 kg/ha	5260 kg/ha	10.95	4
Oats*	1957 kg/ha	1944 kg/ha	-0.66	4
Oats*	1957 kg/ha	2053 kg/ha	4.91	4
Oats*	1957 kg/ha	2042 kg/ha	4.34	4
Oats*	1957 kg/ha	2087 kg/ha	6.64	4
Alfalfa*	5395 kg/ha	6051 kg/ha	12.16	4
Alfalfa*	5395 kg/ha	7220 kg/ha	33.8	4
Alfalfa*	5395 kg/ha	8286 kg/ha	53.59	4
Alfalfa*	5395 kg/ha	9342 kg/ha	73.16	4
Corn*	6674 kg/ha	7631 kg/ha	14.34	4
Corn*	6674 kg/ha	8458 kg/ha	26.73	4
Corn*	6674 kg/ha	8905 kg/ha	33.43	4
Corn*	6674 kg/ha	9334 kg/ha	39.86	4
Corn*	7528 kg/ha	8029 kg/ha	6.66	4
Corn*	7528 kg/ha	8497 kg/ha	12.87	4
Corn*	7528 kg/ha	8783 kg/ha	16.67	4
Corn*	7528 kg/ha	9130 kg/ha	21.28	4
Soybean*	2448 kg/ha	2610 kg/ha	6.62	4
Soybean*	2448 kg/ha	2695 kg/ha	10.09	4
Soybean*	2448 kg/ha	2818 kg/ha	15.11	4
Soybean*	2448 kg/ha	2890 kg/ha	18.06	4
Soybean*	2565 kg/ha	2678 kg/ha	4.41	4
Soybean*	2565 kg/ha	2742 kg/ha	6.90	4
Soybean*	2565 kg/ha	2845 kg/ha	10.92	4
Soybean*	2565 kg/ha	2894 kg/ha	12.83	4
Maize*	6.3 T/ha	7.2 T/ha	14.29	8
Maize*	6.3 T/ha	8.8 T/ha	39.68	8
Maize*	6.3 T/ha	9.6 T/ha	52.38	8
Bean*	165 kg/ha	257 kg/ha	55.76	8
Bean*	165 kg/ha	259 kg/ha	56.96	8
Bean*	165 kg/ha	383 kg/ha	132.12	8

*Indicates a statistically significant yield increase from RP in this trial. Some trials did not analyze for statistical significance.

References

1. Achmad Arivin Rivaie. Changes in Soil Available Phosphorus, Leaf Phosphorus Content and Yield of Sword Bean (Canavalia ensiformis (L.) DC.)by Application of SP-36 and Phosphate Rock on Acid Upland Soil of East Lampung. J Trop Soils, Vol. 20, No. 1 , 2015: 29-36.

2. Aliyu Lawal Sokoto, Ajit Singh. Yield and yield components of cowpea (Vigna unguiculata (L.) Walp.) as influenced by Sokoto phosphate rock and placement methods in the semi-arid zone of Nigeria. Nutrient Cycling in Agroecosystems. July 2008, Volume 81, Issue 3, pp 255–265.

3. Antonio P. Mallarino, assistant professor, agronomy David Rueber, superintendent. Evaluation of Superphosphate and Rock Phosphate for a Corn-Oat-Forage Rotation.

4. Choudhary, M., Peck, T. R., Paul, L. E. and Bailey, L. D. L994. Long-term comPalryn of rock phosphate with superphosphate on crop yield in two cereal-legume rotations. Can. J. Plant Sci. 74: 303-310.

5. C.H. Van den Berghe. The effect of Matongo rock phosphate and urea as compared to di-ammonium phosphate in the composting process and the yield of potatoes in the Mugamba region in Burundi. Fertilizer Research 45:51-59, 1996.

6. Gurdeep Kaur & M. Sudhakara Reddy (2017) Improvement of crop yield by phosphate-solubilizing Aspergillus species in organic farming, Archives of Agronomy and Soil Science, 63:1, 24-34.

7. Himani Singh & Sudhakara M. Reddy (2012) Improvement of wheat and maize crops by inoculating Aspergillus spp. in alkaline soil fertilized with rock phosphate, Archives of Agronomy and Soil Science, 58:5, 535-546, DOI: 10.1080/03650340.2010.532125

8. K. W. NDUNG'U, J. R. OKALEBO, C. O. OTHIENO, M. N. KIFUKO, A. K. KIPKOECH and L. N. KIMENYE. RESIDUAL EFFECTIVENESS OF MINJINGU PHOSPHATE ROCK AND FALLOW BIOMASS ON CROP YIELDS ANDFINANCIAL RETURNS IN WESTERN KENYA. Expl. Agric. (2006), volume 42, pp. 323–336.

9. K. W. NDUNG'U, J. R. OKALEBO, C. O. OTHIENO, M. N. KIFUKO, A. K. KIPKOECH and L. N. KIMENYE. RESIDUAL EFFECTIVENESS OF MINJINGU PHOSPHATE ROCK AND FALLOW BIOMASS ON CROP YIELDS ANDFINANCIAL RETURNS IN WESTERN KENYA. Expl. Agric. (2006), volume 42, pp. 323–336.

10. Muhammad Waheed, Muhammad Arshad Khan,Taimur Naseem, Dost Muhammad and Maria Mussarat. Improving effectiveness of rock Phosphate through mixing with Farmyard manure, Humic acid and Effective microbes to enhance yield and Phosphorus uptake by wheat. Pure and Applied Biology. Vol. 4, Issue 4, 2015, pp 480-490.

11. O. D. Ojo and A. A. Kintomo, E. A. Akinrinde, M. O. Akoroda. Comparative Effect of Phosphorus Sources for Grain Amaranth Production. Communications in Soil Science and Plant Analysis, 38: 35–55, 2007.

12. SHARMA, S.N AND PRASAD, R. Yield and P uptake by rice and wheat grown in a sequence as influenced by phosphate fertilization with diammonium phosphate and Mussoorie rock phosphate with or without crop residues and phosphate solubilizing bacteria. Journal of Agricultural Science (2003), 141, 359–369.

13. Sri Niwas Sharma , Yashbir Singh Shivay , Rajendra Prasad , Manoj Kumar Dwivedi , Mohammadreza Davari & Sandeep Kumar (2010) Relative efficacy of diammonium phosphate rock and mussoorie rock phosphate plus phosphate solubilising bacteria on productivity and phosphorus balance in ricepotato-mungbean cropping system. Journal of Plant Nutrition, 33:7, 998-1015.