

Interest List Forming For Fall 2023

OUR PRODUCTS

Fertify 2-8-4 +1S, Great for Legumes, Hemp and Turfgrass!

In this issue we briefly discuss why Fertify is great for legumes, hemp and turfgrass. Growers work tirelessly to perfect their craft and determine the best management practices that fit their operation. It takes time and effort to find what works, and understandably, making changes to what has been tried and true can bring about new questions.

Or Try Our Soft Rock Phosphate 0-7-0

Recently we've seen a surge in the price of synthetic phosphate fertilizers and global supply chain issues and geopolitical unrest has showed how volatile the fertilizer market can be. While high crop prices may still make synthetic fertilizer application attractive to growers, some have elected to seek out alternative, more stable sources of phosphate fertilizer.

Fertify 2-8-4 +1S

- >15% Total P_2O_5
- Conventional and certified organic use
- High phosphate N-P-K +S fertilizer blend
- Instant source of P_2O_5 supplied by poultry litter
- Instant and slow-release source of P_2O_5 supplied by soft rock phosphate
- High organic matter for improved soil health

Soft Rock Phosphate 0-7-0

- >20% Total P_2O_5
- Raw rock phosphate, direct from our mine
- Excellent source of calcium and silica for plant health



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Why Apply Fertify?

Due to their solubility, synthetic fertilizers have long been the most common source of phosphate for agricultural crops. However, there are some drawbacks to consider, especially as the price of synthetic fertilizers continues to trend upwards.

Highly soluble phosphate fertilizers applied in the soil or on the soil surface can be easily lost by leaching or as runoff under conditions of excess moisture. Not only is the grower losing money, but this displaced phosphate often ends up in local waterways and is a primary cause of pollution in rivers and lakes near agricultural operations. In addition, synthetic phosphate fertilizer that is not lost due to leaching, is highly susceptible to being tied-up in the soil, losing its solubility and becoming unavailable for immediate plant uptake. It is commonly accepted by industry and manufacturers that growers lose 50-70% of applied P_2O_5 , and in more calcareous soils (high calcium) can be as high as 80-90%. Synthetic fertilizer, while being mostly available year one, is limited by the uptake potential of the plant use in that growing season and how much money is being lost due to being tied up and or leached away?

Furthermore, there is the environmental impact of manufacturing synthetic fertilizer. The conversion of rock phosphate to synthetic fertilizer is a 4:1. Every ton of synthetic fertilizer creates 4 tons of waste (phosphogypsum stacks) that are radioactive in many cases, especially Northern Florida where billions of tons reside. Applying synthetic phosphate fertilizers comes at a significant financial and environmental cost and how much return on investment can a grower receive on something that can be easily lost to the environment or effectively revert to an unavailable nutrient?

Rock phosphate has been historically viewed as being slow to release (3-4 years), lower in total P_2O_5 (20%+), and less ideal for high input crops that need immediate uptake in large volumes. Advances in science and technology have improved the efficacy of rock phosphate. For example, finer crushed material (100 mesh) increases surface area for breakdown and the addition of natural sulfur that acts as the acidifying agent to speed up the breakdown of rock phosphate. There can be as much as 80% of P released from rock phosphate in 12 months (depending on environmental conditions).

Rock phosphate provides even delivery of phosphate and is great for perennials, fixed plantations, and turf etc. It is ideal for legumes which use high amounts of phosphate but are capable of scavenging for their own phosphate, reducing their reliance on soluble phosphate fertilizer. Rock phosphate is far less susceptible to leaching and runoff losses and as such is far less damaging to the environment.

Fertify is a cost effective, non-leaching source of organic matter and steady release phosphate, great for legumes, perennials, and turf



Fertify 2-8-4 +1S is a highly cost-effective alternative to synthetic phosphate fertilizers and is ideal for growers that have a longer-term view towards soil health. It provides phosphate from two separate sources: Chicken litter which supplies a minimum of 80% of total P_2O_5 available in year 1 and rock phosphate which supplies a minimum of 30% of total P_2O_5 available year 1 (University of Minnesota, 2018. <https://extension.umn.edu/phosphorus-and-potassium/understanding-phosphorus-fertilizers>).

This gives the plant the nutrients it needs for the growing season while also building soil phosphate reserves. Fertify also contains high levels of organic matter which help build the soil profile/topsoil, microbial communities, and improve overall soil health. Fertify can also be used in tandem with or blended with synthetic fertilizers. This allows crops to access soluble P from early while also providing extended release of P throughout the growing season. Using Fertify to help build soil P reserves reduces the amount of synthetic phosphate fertilizer needed in subsequent growing seasons allowing growers to maximize the advantages of both fertilizers while minimizing losses and environmental impacts.

Legumes: A Prime Candidate for Fertify

Legumes manufacture their own nitrogen for growth and as such do not require significant N fertilization outside of cases where the soil is extremely deficient. However, a large amount of phosphate is required to carry out the process of N fixation and therefore adequate soil phosphate fertility is important for legume production. Unlike other crops, legumes have an innate ability to acidify their root zone allowing them easy access to insoluble phosphate. This effectively makes legume crops largely unresponsive to synthetic phosphate fertilizers because they do not require highly soluble P.

Crop years featuring a legume provide the perfect opportunity for growers who might be hesitant about applying an alternative source of phosphate fertilizer. Why pay a premium for highly soluble synthetic phosphate fertilizers for legumes that don't require highly soluble phosphate? Fertify 2-8-4 +1S is an excellent and inexpensive fertilizer option for legumes. The low salt index allows for high application rates without risking damage to the seed. The steady release of nutrients provides phosphate for the current crop year, replaces phosphate removed by the crop, and helps build soil phosphate reserves for subsequent years. Fertify also includes the benefits of potassium, calcium, and organic matter, which enhances soil biological activity and increases soil carbon (C) accumulation, allowing growers to build better, healthier soils.

Pea & Lentil

Pea and lentil crops have similar nutritional requirements and the recommended rates of Fertify for peas and lentils based on Olsen P test are shown in Table 1. Phosphate has relatively low soil mobility and as such is typically most effectively placed near the seed, however, excess fertilizer near pea seed can reduce germination and emergence. Research has shown up to 30 lbs/acre of seed-placed P₂O₅ can be applied without damaging the seed and higher rates can be applied provided there are adequate soil moisture conditions. If the goal is maintaining soil fertility, a pea crop removes about 0.7 lb P₂O₅ for each bushel of yield. A 50 bushel/acre pea crop will remove about 35 lbs of P₂O₅ per acre. This crop would require an application rate of 438 lbs/acre of Fertify 2-8-4 +1S organic fertilizer.

Research has shown an application of 30 lbs P₂O₅/acre increased lentil yields by 100-150 lbs/acre compared to lentils which did not receive phosphate fertilizer. Seed-placed P fertilizer has been seen to reduce lentil stands and as such it is recommended to broadcast P fertilizer or apply in a mid-row band. A 30 bu/acre lentil crop removes about 17-20 lbs P₂O₅/acre which would require an application rate of about 213-250 lbs Fertify /acre.

Table 1: Fertify application rate on pea and lentil based on Olsen P soil test

Olsen P test ppm	Recommended P ₂ O ₅ -----lbs/acre -----	Fertify (2-8-4 +1S) Application Rate
0-3	40	500
4-7	30	375
8-11	20	250
12-15	10	125
16+	0	0

Source: <https://www.ag.ndsu.edu/publications/crops/soil-fertility-recommendations-for-field-pea-lentil-and-chickpea-in-north-dakota#section-9>

Alfalfa

Alfalfa is an excellent forage crop, it is rich in protein, fiber, and mineral substances for animal nutrition especially ruminants. Studies have show alfalfa responds well to rock phosphate fertilization which has been shown to increase shoot biomass and increase overall dry matter yield compared to synthetic fertilizers.

Alfalfa forages are known to minimize phosphate losses from soil erosion however spring snowmelt runoff can carry dissolved phosphate from the soil surface and unharvested plant material into local waterways. There are a few strategies to help reduce this loss:

- Timing the application of phosphate fertilizer or manure immediately following the first cut harvest to allow more time for the applied phosphate to react with the soil and for plant uptake.
- Subsurface placement of phosphate into established stands with coulter or spoke-application. This must be done without damaging alfalfa crowns or roots.

Table 2 shows the recommended rate of Fertify 2-8-4 +1S fertilizer based on the Montana State University guidelines for phosphate fertilization for alfalfa production in Montana.

Table 2: Phosphate fertilizer guidelines for alfalfa production in Montana

Olsen P Soil Test ppm	Recommended P ₂ O ₅ ---lbs/acre for each ton of alfalfa---	Fertify (2-8-4 +1S) Application rate
<8	6-10	75-125
8-18	4-8	50-100
18-24	2-4	25-50
>24	1-2	12-25

• Estimating Alfalfa Yield: 0.20 to 0.25 tons of alfalfa production for each inch of water use. Estimate the water use based on location, experience, and weather. Assume approximately 1/4" of water use per day under hot/dry conditions. This means 3.5 - 4.0 inches every two weeks in mid-summer. This means that the crop is producing 0.8 to 1.0 tons of dry matter every two weeks in mid-summer.

• Information sourced from Dept. of Plant, Soil & Environmental Sciences, Montana State University





Fertify to meet hemp phosphate needs

Hemp is an annual herbaceous plant typically grown for fiber, seed, or flowers. Hemp is a short-day plant and enters its reproductive stage once the day length is less than 11 to 14 hours of sunlight. Hemp grown for seed is generally grown with medium to shorter varieties. Hemp varieties grown for flowers range in height, have relatively wide canopies, and are grown primarily to extract essential oils. Hemp requires adequate moisture at planting and prefers well-drained soils for optimum crop establishment. Hemp grows well in arid regions that receive heavy snowfall in the winter. This provides spring moisture and the arid atmosphere and cool nights stave off waves of botrytis that can quickly destroy a crop. Direct seeding into the ground is preferred for fiber and seed production at a very high plant density (0.1–0.8 million/acre) to encourage shoot growth or seed production in view of its lower economic value.

Hemp uses moderate amounts of phosphate for growth. Due to its low mobility in the soil, phosphate typically performs best when placed near the root zone. However, seed-placed phosphate can reduce germination in less-than-ideal soil conditions such as cool, dry, or wet compacted soils. Research has shown under ideal growing conditions, plant population, and grain yield was not affected by increasing the rates of P₂O₅ up to 50 pounds actual per acre. The following table shows the nutrient uptake and removal by the harvested grain of hemp. To meet plant phosphate uptake, would require 625 lbs Fertify (2-8-4 +1S)/acre.

Nutrient Uptake and Removal of Hemp (lbs/acre)

Nutrient	Total Plant	Grain
N	200	40
P₂O₅	47	19
K	211	10
S	14	3

**Source Hemp: MAFRD

It is important to make sure fertilizers applied to hemp don't have an excess of heavy metals in them. Hemp is an accumulator of heavy metals which can impact the sale of harvested hemp. Whether for biomass or flower, harvested hemp must contain well under the recommended limit of heavy metals. Fertify is certified organic and contains low heavy metals making it an excellent choice for meeting hemp phosphate needs.

Testing Hemp Varieties in Montana

Research from the Montana State University's Eastern Ag Research Center (EARC) in 2019 and 2020 evaluated different hemp varieties under irrigated systems and found:

- The highest seed yield was produced by X-59 (2,359 lbs/acre), CFX-1 (2,285 lbs/acre), and Altair (1,892 lbs/acre)
- The highest biomass yield was observed in NWG-2730 (8,874 lbs/acre), Altair (7,925 lbs/acre), and X-59 (6,697 lbs/acre)
- Bialobrzieskie seed yield was 277 lbs/acre and biomass was 6,033 lbs/acre.
- Hlukhovskii 51 seed yield was 327 lbs/acre and biomass was 5,460 lbs/acre.
- Hlesia (Glesia) seed yield was 596 lbs/acre and biomass was 5,755 lbs/acre.
- Bialobrzieskie, a Polish variety, showed strong dual cropping potential for fiber and grain, however had poor harvestability due to its tall height was difficult to combine.
- Katani, at 43 inches or X-59 at 57 inches post-flowering, is shorter and easier to combine at harvest.
- Katani is suitable for growth in the Northern US and has been recognized for superior harvestability and consistently higher CBD levels than other varieties.
- Altair and Anka both showed good yields and oil content and can be used for grain and/or fiber.
- NWG-2730 is a CBD grain variety
- NWG-452 has dual cropping abilities.
- Hlukhovskii 51 was developed for fiber quality and has shown a high fiber yield.
- Planting date studies using Katani and CRS-1 found mid-May was the best seeding date for planting hemp under irrigation



Fertify for lawns and turfgrass operations

Phosphorus fertility is an important component for growing healthy turfgrass. The goal of phosphate fertilization should be to supply enough nutrients to sustain healthy turfgrass growth and to minimize environmental risk. It is recommended that turf growers work to maintain soil phosphate levels between 25 and 50 ppm (Mehlich-3 P).

Turf stands in soils within this range should receive a maintenance phosphate application of 1/8-1/4 lb of P_2O_5 per lb nitrogen [N] applied annually. Turf stands in soils below 25 ppm should receive starter phosphate fertilizer to increase soil phosphate levels and soils over 50 ppm require no application. Frequent soil testing (one to three years) is recommended to monitor soil phosphate levels and soil N:P ratio to determine if P_2O_5 applications are needed. It is also beneficial to monitor soil organic matter content.

Generally, increases in soil organic are a natural occurrence in turf operations however rapid buildup of soil organic matter (particularly from thatch accumulation), is an indicator of excessive fertilization or irrigation and infrequent cultivation. A significant decline in soil organic matter could be due to aggressive cultivation in the year prior.

Phosphate fertilization of turfgrass has come under scrutiny. While it is important to maintain adequate levels of soil phosphate to sustain healthy turfgrass growth, it is important to minimize environmental risk. Application of readily soluble, synthetic phosphate fertilizers are susceptible to losses due to runoff and leaching and risks polluting water bodies, reducing the water quality of ponds, lakes, and streams.

Fertify provides nutrients needed for growing turf grass without negatively impacting the environment. Chicken manure contains a concentrated amount of nitrogen and phosphate to help support strong grass growth and the additional rock phosphate promotes building healthy soil phosphate levels. Fertify is an organic material and as such, growers won't have to worry about any negative implications associated with synthetic fertilizers. Fertify is non-leaching and has a low salt-index making it a healthy addition to the soil without risking contamination of waterbodies.



- **Non-leaching source of slow-release P_2O_5**
- **Certified organic**
- **Build soil health sustainably**





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FERTIFY 2-8-4 +1S

CERTIFIED ORGANIC

CONVENTIONAL

**CALL FOR PRICING AND
AVAILABILITY**

**F.O.B. KINSEY,
MONTANA**

Soft Rock Phosphate 0-7-0

SIZE: 1/4" (-)
30 Mesh (-)

**CALL FOR PRICING AND
AVAILABILITY**

**F.O.B. BUTTE,
MONTANA**

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