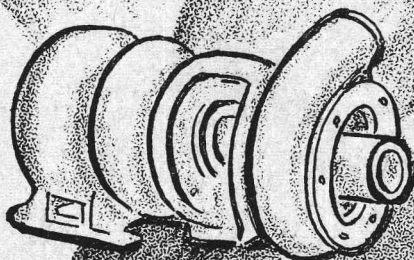
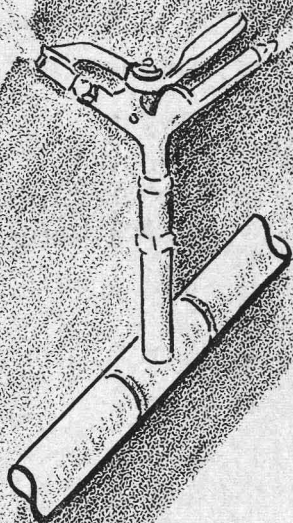


Applying Fertilizer Through Sprinkler Systems

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Applying Fertilizer Through Sprinkler Systems

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You can apply water-soluble fertilizers through sprinkler irrigation systems effectively and economically if you follow the rules.

Rule 1. Apply Fertilizer at the Right Time

The time to apply depends on both the crop and the type of fertilizer.

Nitrogen fertilizers can be applied at any time during the early part of the growing season for most irrigated crops. More than one application during the growing season is preferable on some crops, especially on pastures.

All phosphate fertilizers should be applied at planting time for most vegetable crops. Phosphate applications in fall or early spring usually are preferable for pastures in western Oregon. In general, then, phosphate fertilizers should be applied in fall or early spring when sprinkler systems are not in use.

Plants make good use of potash applied during the growing season but it is preferable to apply part of the potash at planting time for annual crops or early in the spring for perennial crops. Sprinkler application of potash fertilizers can be made whenever a crop shows potash deficiency symptoms during the growing season. Yield increases from potash applied to row crops late in the season probably will not be as large, however, as from applications made early in the growing season. Two or three applications during the growing season are preferable when irrigated grass-legume pastures need potash.

Rule 2. Apply the Right Fertilizer

Many fertilizers can be applied through a sprinkler irrigation system. This does not necessarily mean that they *should* be applied in this manner. The fertilizer should dissolve and stay in water solution and should not be a corrosive hazard to the irrigation system.

Fertilizers that CAN be applied through a sprinkler system

Ammonium Nitrate

Calcium Nitrate

Solution 32

13-39-0 Ammonium Phosphate

11-48-0 Ammonium Phosphate

8-24-0 Liquid Ammonium
Phosphate

MINOR ELEMENTS—Iron, Cop-
per, Zinc, and Manganese in
the sulfate or chelate form

Ammonium Sulfate

Urea

16-20-0 Ammonium Phosphate

20-52-0 or 21-53-0 di ammonium
phosphate

Muriate of Potash

Potassium Sulfate

Some mixed fertilizers

Water soluble boron fertilizers

Fertilizers that SHOULD NOT be applied through sprinkler systems

Phosphoric Acid

This is water soluble and can be applied through a sprinkler system but it will cause considerable corrosion.

Anhydrous Ammonia (NH_3)

This material is water soluble but a large percentage of the nitrogen would be lost in the air.

Ammonia solutions (aqua ammonia)

This material is water soluble but a large percentage of the nitrogen would be lost in the air.

Fertilizers that CANNOT BE applied through sprinkler systems

Superphosphates

Elemental Sulfur

Some mixed fertilizers

Gypsum

Lime

These materials will not dissolve thoroughly in water.

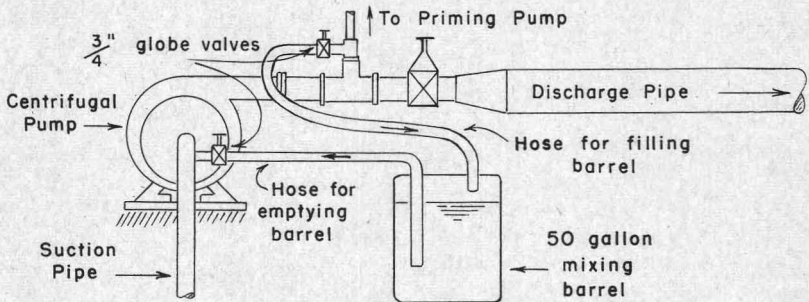
Rule 3. Use the Right Equipment

Equipment set-ups for injecting fertilizer into sprinkler systems should be such that the rate of fertilizer injection can be controlled easily.

The following described methods have proved satisfactory:

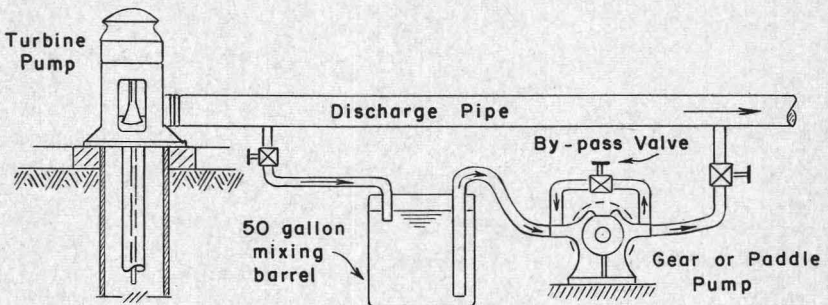
Centrifugal pump with barrel

Most suction and discharge adapters now sold for pumps are equipped with outlets for fertilizer injection equipment.



Turbine pump with injection pump

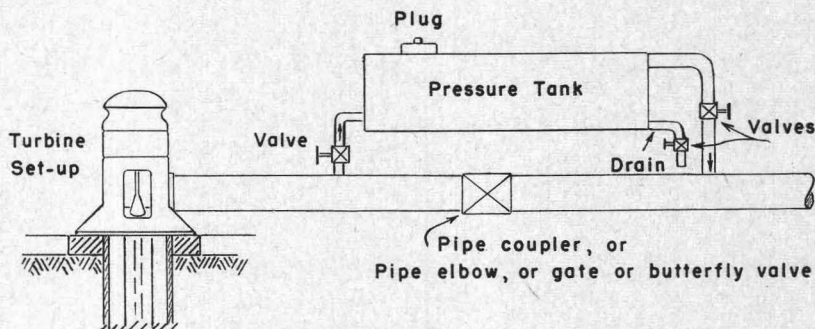
Since the injection pump is a positive displacement type, it is difficult to control the rate of injection unless the pump is equipped with a bypass valve. If the pump has no bypass valve, fertilizer can be added to the mixing barrel periodically in small quantities during the injection period.



Turbine pump with closed tank

A closed tank hookup may be purchased commercially or made in the home shop.

The rate that the fertilizer solution enters the sprinkler system will depend on pressure losses in the mainline and in the closed tank setup. All pipes and fittings in the setup should be 1-inch in diameter or larger.



If there is a coupling or an elbow in the mainline, the closed-tank setup should be attached to the mainline around it. If the friction loss in the mainline where the attachments are made is less than 1.0 foot per 100 feet, a gate or butterfly valve should be installed in the mainline to increase the pressure loss during the period of injecting fertilizer.

Rule 4. Apply Water Uniformly

Uniformity of fertilizer distribution will be no better than that of the water which carries it. For this reason, application of fertilizers through sprinkler systems is advised only if you insure even distribution of the water.

The longer the period of time taken to inject the fertilizer into the system the more uniform the distribution. Oregon State University research shows that at least 30 minutes should be taken to inject the fertilizer into the sprinkler system for each application.

The sprinkler system should be operating according to design recommendations. Check all sprinkler heads for pressure and speed of rotation. Most sprinklers are designed to operate at about one revolution per minute. They should never rotate faster than four revolutions per minute or so slowly that water puddles under the stream. The speed of rotation should be uniform. If sprinkler heads are not operating properly, they may need only new bearing washers or they may need a complete overhaul.

Check the rate of discharge at the first sprinkler and the last sprinkler on the lateral by catching a discharge from the sprinklers in a pail and noting the catching time. The difference in rate of discharge between the two should be less than 10% of the higher rate. If the difference is greater than this, the distribution of the fertilizer will be poor.

Do not apply fertilizer when the wind is blowing.

Rule 5. Apply the Right Amount

The following chart indicates the number of acres covered by one sprinkler at different spacings. Multiply appropriate area by number of sprinklers operating to determine acres covered per setting.

Sprinkler spacing	Area covered by one sprinkler
<i>Feet</i>	<i>Acres</i>
20 x 40	0.0184
30 x 40	0.0275
40 x 40	0.0367
30 x 50	0.0344
40 x 50	0.0459
30 x 60	0.0413
40 x 60	0.0551
60 x 60	0.0826
60 x 80	0.1102

Rule 6. Prevent Leaching

There is a possibility of losing nitrogen fertilizer by leaching if the fertilizer is applied at the beginning of a set *and if* some spots in the field are over-irrigated. It is better to apply no more than 2 inches of water after adding nitrate nitrogen.

It would be advisable to apply at least 1 inch of water after any fertilizer application to move some of the fertilizer down into the root feeding zone.

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