

Fertirrigation Practice in Italy

PROFESSOR VINCENT P. CAROCCI BUZI

Alpine Experimental Centre, Botanic Institute, University of Rome

A SYSTEM is now in operation in the Italian Alps to obtain maximum pasture production by utilization of the hydraulic resources available at high elevations.

It is well known that the chief limiting factor in pasture development is the inadequate distribution of organic fertilizers represented by liquid and solid animal excreta. This excreta, rich in nitrogen, phosphorus, and potassium as well as in the biochemical principles, phytohormones and auxones, is mostly accumulated near barns or sheep folds, but instead of being spread out to produce rich forage for pasturage of stock and eventually for hay making, it is allowed to accumulate, so that, owing to the excess of humus, it supports only useless nitrophilic vegetation.

One attempt to utilize this organic fertilizer was by means of a fertilizer-irrigation scheme, carried out by means of a small stream of water diverted to flow through the stable or barn, flushing out the animal droppings, and distributing them by means of small channels over the slopes below the barns. This method is successful only where the livestock barns are placed at high elevations. Moreover there is the obstacle of uneven flow of water on an irregular topography, and uneven distribution of the fertilizer elements, while percolation may be slower than runoff.

A considerable advance in technique was achieved by Dr. G. Friedmann, whereby water is conveyed by pipes to the stable and the high pressure used to pick up the urine and dung by means

of nozzles. The resultant liquid (Italian—Liquame) is collected in a reservoir at any desired dilution.

The solution is fed into a system of permanent underground piping from which it is pumped through a movable or portable piping system of light metal, joined by easily manipulated joints, into the spraying apparatus, which is mostly of the rotating type. From these spray nozzles the mixture is spread onto the pastures in the form of rain. To exclude the solid material, straw, etc., from being fed into the reservoir a machine has been designed to operate by a treadle or motor to free the manure from the straw.

The hydraulic apparatus called a mixer (Italian—miscelatore) which mixes the manure by means of high pressure water (Fig. 1) must be capable of altering the dilution of the liquid fertilizer, and also of increasing pressure so that with small discharges an adequate area can be covered by the jet, and the fertirrigation can be conducted at stable level with maximum discharge and also heavy discharges achieved with greatest range, as much as 200 metres (Fig. 2). If the intake of the system lies higher than the stable or yard a pump is not required, but if the spring is lower an ordinary pressure pump is found satisfactory because the mixing device is placed in the circuit after the pump, which can be a rotary one as it works with clean water.

From an agronomic point of view the system requires adjustment in both the amount of water and the fertilizer content to be used on the pasture according

to the seasonal requirements of the pasture association, and the nature of the pasture rotation.

Irrigation in this way is carried out at five to seven day intervals, calculated to keep the surface horizons of the soil

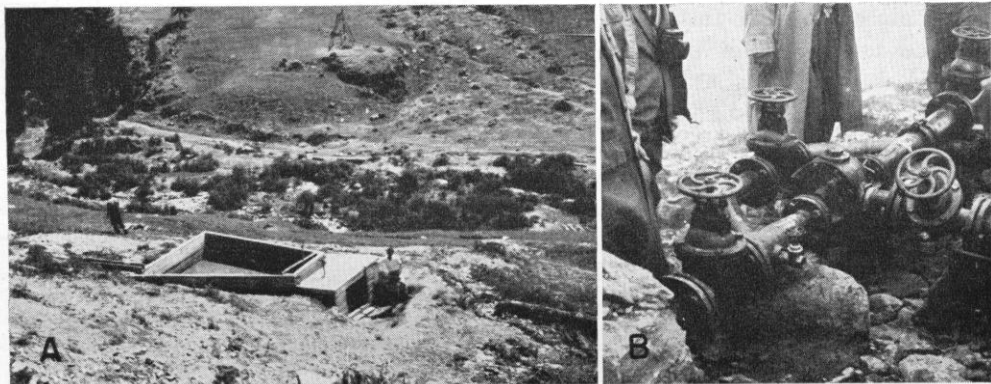


FIGURE 1. FERTIRRIGATION EQUIPMENT. A. Mixer. B. Pressure automan (distributor) system.



FIGURE 2. The fertirrigation system in action on a good mountain pasture.

Normally the lowest dilutions (2 to 5 percent) are preferred, as at these concentrations most of the fertilizer is absorbed, and it comes more easily into contact with the root system. The practice is usually to precede the fertirrigation with a previous irrigation with pure water.

permanently moist, and encourage the maximum production of forage, as well as a thickening of the surface cover of vegetation to guard against erosion. The scheme aims at a progressive improvement in the composition of the pasture, i.e. its qualitative evolution.

It is possible also to combine mineral

fertilizers with the mixture, especially phosphates, by means of a mixing chamber.

Irrigation is indispensable in the dry mountain climates of Italy and without it good forage cannot be obtained. In practice it is found that one hectare of soil regularly irrigated and well fertilized by this system will yield more than several hectares of poor and arid pasture.

The system briefly described here was originally developed in Switzerland where it was established and popularized by

Dr. Friedmann, a specialist in this type of practice, who was appointed by the Swiss Government as its adviser on the subject.

Recently in Italy some units for fertirrigation were set up in Aosta Valley (Piedmont) and at Valtellina (Lombardy). It is expected that the practice will spread, and nine units will be established.

The value of the system has been adequately demonstrated and well tested.



BROTHERHOOD

Science and art belong to the whole world, and before them vanish the barriers of nationality.—*Goethe*.

God grant that not only the love of liberty, but a thorough knowledge of the rights of man may pervade all nations of the earth, so that a philosopher may set his foot anywhere on its surface, and say, "This is my country."—*Benjamin Franklin*.

The world is my country, all mankind are my brethren, and to do good is my religion.—*Thomas Paine*, in *Rights of Man*.

The crest and crowning of all good, Life's final star, is Brotherhood.—*Edwin Markham*, in *Brotherhood*.